Project Manual

Early Childhood Center
At Two Rivers School
Snoqualmie Valley School District

OWNER:
SNOQUALMIE VALLEY
SCHOOL DISTRICT
MAINTENANCE AND OPERATIONS
8001 SILVA AVE SE
SNOQUALMIE, WA 98065
(425) 831-8031

PROJECT ARCHITECT:
SCR ARCHITECTS
1221 East Pike Street
Suite 205
SEATTLE, WA 98122
(206) 228 1014

DATE: October 31, 2024

Project Directory

Early Childhood Center
At Two Rivers School

	ADDRESS	E-MAIL AND PHONE NUMBER
OWNER	Snoqualmie Valley School District, Facilities and Construction 8001 Silva Ave. SE Snoqualmie WA 98065. **Brandon Klepper,** Director of Operations **Ryan Stokes,** Assistant Superintendent	 klepperb@svsd410.org / 425-831-8005 ryans@svsd410.org / 425-831-8012
ARCHITECT	SCR Architects, 1221 E. Pike St. Suite 205 Seattle WA 98122. **Scott Connor,** Architect	 scott@scr-arch.com / 206-228-1014
CIVIL	Jacobson Consulting Engineers 255 S King St. Suite 800 Seattle, WA 98104 **Sascha Eastman,** Civil Engineer	 sascha@jacobsonengineers.com / 206-293-9134
STRUCTURAL	Atlas Design Group 600 1st Ave. #600C Seattle, WA 98104 **Christopher Padin,** Structural Engineer	 chris.padin@adg-inc.com / 425-400-9242
ELECTRICAL	TFWB Engineers 1200 Westlake Ave. N. Suite 509 Seattle, WA 98109 **Kevin Wartelle,** Electrical Engineer	 kevin@tf-wb.com / 206-459-3362
MECHANICAL	Bogard Pasqua Engineers 22121 17th Avenue SE, Suite 111 Bothell, WA 98021 **Lee Bogard,** Mechanical Engineer	 lbogard@bp-eng.com / 425-415-6100

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DOCUMENT 00 01 15 - LIST OF DRAWING SHEETS

1.1 LIST OF DRAWINGS

A. Drawings - Drawings consist of the Contract Drawings and other drawings listed on the Table of Contents page of the separately bound drawing set titled Early Childhood Center at Two Rivers School, Bid Set, dated 10/31/2024, as modified by subsequent Addenda and Contract modifications.

B. List of Drawings: Drawings consist of the following Contract Drawings and other drawings of type indicated:

TITLE SHEETS

A0.01 COVER SHEET

SURVEY SHEET

1 OF 1 BOUNDARY AND TOPOGRAPHIC SURVEY

CIVIL SHEETS

C000 COVER SHEET
C100 OVERALL DEMOLITION PLAN
C101 DEMOLITION PLAN
C102 DEMOLITION PLAN
C200 OVERALL TESC PLAN
C201 TESC PLAN
C202 TESC PLAN
C210 TESC DETAILS
C211 TESC DETAILS
C300 OVERALL GRADING & PAVING PLAN
C301 GRADING & PAVING PLAN
C302 GRADING & PAVING PLAN
C310 PAVING DETAILS
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C400 OVERALL STORM DRAINAGE PLAN
C401 STORM DRAINAGE PLAN
C402 STORM DRAINAGE PLAN
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C411 STORM DRAINAGE DETAILS
C412 STORM DRAINAGE DETAILS
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C500 OVERALL FIRE PLAN

ARCHITECTURAL SHEETS

A0.05	CASEWORK SCHEDULE, WINDOW & RELITE SCHEDULE
A0.06	SIGNAGE SCHEDULE
A0.07	COMPOSITE ELEVATION AND ACCESSIBLE LAYOUTS
A0.08	COMPOSITE ELEVATION AND ACCESSIBLE LAYOUTS
A0.11	ASSEMBLY TYPES
A1.01	SITE PLAN
A1.02	SITE PLAN - DEMOLITION
A1.03	SITE PLAN - NEW WORK
A1.04	SITE DETAILS
A1.06	LANDSCAPE PLAN - NEW WORK
A1.10	KEY PLAN - AREAS OF WORK
A1.11	EXITING PLAN
A1.12	CODE REVIEW + AREA ANALYSIS
A1.20	DEMO FLOOR PLAN AND NOTES
A1.21	DEMO REFLECTED CEILING PLAN AND NOTES
A2.04	ATTIC PLAN
A2.05	ATTIC FLOOR FRAMING PLANS
A2.06	ROOF PLAN
A2.10	ENLARGED FLOOR PLAN
A2.11	ENLARGED FLOOR PLAN
A2.12	ENLARGED FLOOR PLAN
A2.13	ENLARGED FLOOR PLAN
A2.14	ENLARGED FLOOR PLAN
A3.01	BUILDING ELEVATIONS
A3.02	BUILDING ELEVATIONS + WINDOW TYPE
A3.04	COURT YARD ELEVATIONS
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A8.03	DETAILS
A8.04	DETAILS
A8.05	DETAILS

A8.06 DETAILS
A9.01 CASEWORK SECTIONS

STRUCTURAL SHEETS

S0.00 COVER SHEET
S1.00 GENERAL STRUCTURAL NOTES
S1.01 GENERAL STRUCTURAL NOTES
S1.02 GENERAL STRUCTURAL NOTES
S1.03 PLAN NOTES AND LEGENDS
S2.00 FOUNDATION PLAN
S2.01 ROOF FRAMING PLAN
S3.00 TYPICAL CONCRETE DETAILS
S3.01 CONCRETE DETAILS
S6.00 TYPICAL WOOD DETAILS
S6.06 WOOD SHEAR WALL DETAILS
S6.07 STRAP AND HOLDOWN DETAILS
S6.08 WOOD ROOF DETAILS
S6.09 WOOD ROOF DETAILS

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M0.01 MECHANICAL LEGEND, NOTES, ABBREVIATIONS AND SCHEDULES.
MD1.01 MECHANICAL DEMOLITION FLOOR PLAN
M1.00 MECHANICAL FOUNDATION PLAN
M1.01 MECHANICAL FLOOR PLAN
M2.01 ENLARGED MECHANICAL PLANS
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ED3.00 DEMO PLAN - ELECTRICAL

END OF DOCUMENT 00 01 15

INVITATION TO BID

SNOQUALMIE VALLEY SCHOOL DISTRICT NO. 410

The Snoqualmie Valley School District extends an invitation to qualified General Contractors to bid the construction project hereinafter identified as Early Childhood Center at Two Rivers School**.**

PROJECT SCHEDULED BID DATE

The Bid will be received in three parts:

The main Bid shall be in a sealed envelope and shall be received until 2:00 pm, Tuesday, December 3, 2024 and, after all bids are in and logged, will be opened and publicly read.

The first list of subcontractors shall be received until 3:00 pm, one hour later. The first list of subcontractors shall be in a sealed envelope and submitted at the same bid location as indicated below.

The second list of subcontractors shall be received until 48 hours after initial published bid date, at 2:00 pm, Thursday December 5, 2024. The second list of subcontractors shall be in a sealed envelope and submitted at the same bid location as indicated below.

LOCATION OF BID SUBMITTAL AND OPENING:

SNOQUALMIE VALLEY SCHOOL DISTRICT NO. 410
Business Office
8001 Silva Ave. SE
Snoqualmie, Washington 98065

PROJECT SCOPE

The Snoqualmie Valley School District wishes to contract all services required to construct additions to an older alternative high school to provide a new early childhood center and daycare. Work also includes upgrades to existing structure, site improvements and covered play.

PROJECT DOCUMENTS

Plans, specifications, addenda, and bidder's list for this project are available through Snoqualmie Valley School District. Free of charge access is provided to Prime Bidders, Subcontractors, and Vendors by going to: "http://bxwa.com" and clicking on: "Posted Projects," "Public Works," "Education," and "Snoqualmie Valley School District." Bidders are encouraged to "Register" in order to receive automatic email notification of future addenda and to be placed on the "Bidder's List." This on-line plan room provides Bidders with fully usable on-line documents; with the ability to download, print to your own printer, order full/partial plan sets from hundreds of reprographic sources (on-line print order form), and a free on-line digitizer/take-off tool. Contact Builders Exchange of Washington at 425-258-1303 should you require assistance.
Drawings and specifications may also be acquired through the Architect's office at 1221 E. Pike St, Suite 205, Seattle, WA 98122, (206) 458-7517.

Builders Exchange of Washington
2607 Wetmore Avenue
Everett, Washington 98201-2926
(425) 258-1303
www.bxwa.com

Contractor Plan Center
5468 SE International Way
Milwaukie, Oregon 97222
(503) 650-0148
www.contractorplancenter.com

Seattle Daily Journal of Commerce
83 Columbia Street #200, PO Box 11050, 98111
Seattle, Washington 98104
(206) 622-8272
www.plancenter.djc.com

MANDATORY SITE INSPECTION

General Contractors intending to submit sealed bids must attend the mandatory site inspection conference held at the site:

Wednesday, November 20, at 2:00-3:00 PM. (Meet at main office)

Site Address:

TWO RIVERS SCHOOL
330 Ballarat Ave N
North Bend, WA 98045

Bidders arriving after 2:05 p.m. may not be admitted. Subcontractors and vendor attendance is welcome.

BID SECURITY REQUIREMENT

Bid security, in the amount of 5% of the bid sum must accompany each bid. Security shall be made payable to the Snoqualmie Valley School District either by certified check or bid bond issued by a surety company licensed to conduct business in Washington State.

END OF SECTION 00 11 13

DOCUMENT 00 21 13 - INSTRUCTIONS TO BIDDERS

PART 1 - GENERAL

1.1 USE OF DOCUMENTS

A. Contract Documents are enumerated in Section 00 00 03, “Table of Contents” and Section 00 01 15, “List of Drawing Sheets”.

1.2 RELATED DOCUMENTS

A. Division 00 and Division 01 apply to the work specified in this Section

1.3 DESCRIPTION

A. This Section Provides:

1. Instruction to Bidders for this project.

B. Related Requirements Specified Elsewhere:

1. Section 00 41 13 Bid Form
2. Section 00 52 00 Form of Agreement Between Owner and Contractor
3. Section 00 70 00 Conditions of the Contract

1.4 INCORPORATION OF DOCUMENTS

A. The Bidder and Contractor agree to the provisions of the documents named under this Section and agree to consider such named documents a part of the Project Specification.

PART 2 - INSTRUCTIONS TO BIDDERS

2.1 INSTRUCTIONS TO BIDDERS prepared for Snoqualmie Valley School District, following this page, is incorporated as a part of the contract documents as if bound herein.

END OF DOCUMENT 00 21 13

INSTRUCTIONS TO BIDDERS

1.01 DEFINITIONS

A. All definitions set forth in the General Conditions of the Contract for Construction or in other Contract Documents are applicable to the Bidding Documents.

B. "**Addenda**" are written or graphic instruments issued by the Architect or the Snoqualmie Valley School District prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections. The contents of Addenda are issued in no particular order and therefore should be carefully and completely reviewed. Addenda relating to administrative matters, such as, for example, the date or time of meetings or Bid receipt, may be issued in writing by fax, mail or other delivery.

C. An "**Alternate Bid**" (or "**Alternate**") is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted by the Snoqualmie Valley School District.

D. "**Award**" means the formal decision by the Snoqualmie Valley School District notifying a Bidder with the lowest Responsive Bid of the Snoqualmie Valley School District's acceptance of the Bid and intent to enter into a contract with the Bidder. A contract is only formed upon execution of the contract, and not simply by Award.

E. The "**Award Requirements**" include the following statutory requirements as a condition precedent to Award. The lowest Responsive Bidder shall:

(1) have a certificate of registration in compliance with RCW 18.27;

(2) have a current state unified business identifier number;

(3) if applicable, have industrial insurance coverage for the Bidder's employees working in Washington as required in Title 51 RCW;

(4) have an employment security department number as required in Title 50 RCW;

(5) have a state excise tax registration number as required in Title 82 RCW;

(6) not be disqualified from bidding on any public works contract under RCW 39.06.010 (unregistered or unlicensed contractors) or RCW 39.12.065(3) (prevailing wage violations);

(7) if bidding on a public works project subject to the apprenticeship utilization requirements in RCW 39.04.320, not have been found out of compliance by the Washington state apprenticeship and training council for working apprentices out of ratio, without appropriate supervision, or outside their approved work processes as outlined in their standards of apprenticeship under RCW 49.04 for the one-year period immediately preceding the date of the Bid solicitation;

(8) have received training on the requirements related to public works and prevailing wages under chapters 39.04 and 39.12 RCW, or be exempt from such training requirements if the Bidder has completed three or more public works projects and has had a valid business license in Washington for three or more years; and

(9) within the three-year period immediately preceding the date of the bid solicitation, not have been determined by a final and binding citation and notice of assessment issued by the department of labor and industries or through a civil judgment entered by a court of limited or general jurisdiction to have willfully violated, as defined in RCW 49.48.082, any provision of chapter 49.46, 49.48, or 49.52 RCW.

Further, under revised RCW 39.04.350, if the Bidder has a history of receiving monetary penalties for not achieving the apprentice utilization requirements pursuant to RCW 39.04.320, or is habitual in utilizing the good faith effort exception process, the bidder must submit an apprenticeship utilization plan within ten business days immediately following the Snoqualmie Valley School District's notice to proceed.

F. The "**Base Bid**" is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base to which work may be added to or from which work may be deleted for sums stated in Alternate Bids.

G. A "**Bid**" is a complete and properly signed proposal to do the Work or designated portion thereof, submitted in accordance with the Bidding Documents, for the sums therein stipulated and supported by any data called for by the Bidding Documents.

H. A "**Bidder**" is a person or entity who submits a Bid for a prime contract with the Snoqualmie Valley School District for the Work described in the Contract Documents.

I. The "**Bidding Documents**" include the Advertisement or Invitation to Bid, Instructions to Bidders, the Bid form, any other sample Bidding and contract forms, the Bid Bond, and the Contract Documents, including any Addenda issued prior to receipt of Bids.

J. The "**Contract Documents**" for the Work consist of the Agreement Between Owner and Contractor, the General Conditions of the Contract (as well as any Supplemental, Special or other Conditions included in the Project Manual), the Drawings, the Specifications, and all Addenda issued prior to, and all modifications issued after, execution of the Contract.

K. The "**Owner**" is the Snoqualmie Valley School District No. 410.

L. To be considered "**Responsible**" or meet "**Responsibility**" requirements, a Bidder must meet the following supplemental criteria applicable to this Project to the satisfaction of the Architect and the Snoqualmie Valley School District:

(1) The ability, capacity, and skill to perform the Contract;

(2) The character, integrity, reputation, judgment, experience, and efficiency of the Bidder;

(3) Whether the Bidder can perform the Contract within the time specified;

(4) The previous and existing compliance by the Bidder with laws relating to the Contract;

(5) The quality of performance of previous contracts, including demonstration of successful completion of similar projects of equal or greater size, scope and value in the last three (3) years;

(6) The designated Project Manager shall have a minimum of three (3) years of successful experience in project management and scheduling of projects of similar scope and complexity;

(7) The designated Superintendent shall have a minimum of five (5) years of successful supervision of projects of similar scope and complexity;

(8) Any other qualifications required by the Contract Documents or Bidding Documents; and

(9) Such other information as may be secured having a bearing on the decision to award the contract.

M. 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.

N. A "**Unit Price**" is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services as described in the Bidding Documents or in the Contract Documents. The Snoqualmie Valley School District reserves the right to reject at any time, without impairing the balance of the proposal, any or all such predetermined unit prices.

1.02 BIDDER'S REPRESENTATIONS

By making its Bid, each Bidder represents that:

A. BIDDING DOCUMENTS. The Bidder has read and understands the Bidding Documents, and its Bid is made in accordance with them.

B. POSSIBLE SELF-PERFORMED WORK REQUIREMENT. The Bidder will perform *with its own forces* at least that percentage (if any) of the Work required by the Bidding Documents or the Contract Documents.

C. PRE-BID MEETING. The Bidder has attended any pre-bid meeting(s) required by the Bidding Documents.

D. BASIS. Its Bid is based upon the materials, systems, services, and equipment required by the Bidding Documents, without exception.

E. EXAMINATION. The Bidder has carefully examined and understands the Bidding Documents, the Contract Documents (including, without limitation, any liquidated damages and insurance provisions), and the Project site, including any existing buildings, it has familiarized itself with the local conditions under which the Work is to be performed and has correlated its observations with the requirements of the Contract Documents and it has satisfied itself as to the nature, location, character, quality and quantity of the Work, the labor, materials, equipment, goods, supplies, work, services and other items to be furnished, and all other requirements of the Contract Documents. The Bidder has also satisfied itself as to the conditions and other matters that may be encountered at the Project site or affect performance of the Work or the cost or difficulty thereof, including but not limited to those conditions and matters affecting: transportation, access, disposal, handling and storage of materials, equipment and other items; availability and quality of labor, water, electric power and utilities; availability and condition of roads; climatic conditions and seasons; physical conditions at the Project site and the surrounding locality; topography and ground surface conditions; and equipment and facilities needed preliminary to and at all times during the performance of the Work. The failure of the Bidder fully to acquaint itself with any applicable condition or matter shall not in any way relieve the Bidder from the responsibility for performing the Work in accordance with, and for the Contract Sum and within the Contract Time provided for in, the Contract Documents.

F. PROJECT MANUAL. The Bidder has checked its copies of the Project Manual with the Table of Contents bound therein to ensure the Project Manual is complete.

G. SEPARATE WORK. The Bidder has examined and coordinated all Drawings, Contract Documents, and Specifications for any other contracts to be awarded separately from, but in connection with, the Work being bid upon, so that the Bidder is fully informed as to conditions affecting the Work under the contract being bid upon.

H. LICENSE REQUIREMENTS. Bidders and their proposed Subcontractors shall be registered and shall hold such licenses as may be required by the laws of Washington, including RCW 18.27, for the performance of the Work specified in the Contract Documents.

I. NO EXCEPTIONS. Bids must be based upon the materials, systems and equipment described and required by the Bidding Documents, and terms and conditions in the Contract Documents, without exception.

1.03 BIDDING DOCUMENTS

A. COPIES

1. **Deposit.** Bidders may obtain complete sets of the Bidding Documents from the plan center locations designated in the Advertisement or Invitation to Bid and subject to their terms.

2. **Sub-bidders.** Sub-bidders may also only receive Bidding Documents from the plan center locations designated in the Advertisement or Invitation to Bid and subject to their terms.

3. **Complete sets.** Bidders shall use complete sets of Bidding Documents in preparing Bids and are solely responsible for utilizing established plan holder identification processes to obtain updated bid information; neither the Snoqualmie Valley School District nor the Architect assumes any responsibility for errors or misinterpretations resulting from the use of incomplete and/or superseded sets of Bidding Documents. Printed copies of plans take precedence over any on-line images.

4. **Conditions.** The Snoqualmie Valley School District and/or the Architect make copies of the Bidding Documents available on the above terms only for the purpose of obtaining Bids on the Work and do not confer a license or grant permission for any other use.

5. **Legible Documents.** To the extent any drawings, specifications, or other Bidding documents are not legible, it is the Bidder's responsibility to notify the Snoqualmie Valley School District and the Architect and to obtain legible documents from the plan center.

B. INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

1. **Format.** The Contract Documents may be divided into parts, divisions, and sections for convenient organization and reference. Generally, there has been no attempt to divide the Specification sections into Work performed by the various building trades, any Work by separate contractors, or any Work required for separate facilities in or phases of the Project.

2. **Notify Owner and Architect.** Bidders and Sub-bidders shall promptly notify the Snoqualmie Valley School District and the Architect in writing of any ambiguity, inconsistency, or error that they may discover upon examination of the Bidding Documents or of the site and local conditions. All Bidders and Sub-bidders shall thoroughly familiarize themselves with specified products and installation procedures and submit to the Snoqualmie Valley School District and the Architect any objections (in writing) no later than seven (7) calendar days prior to the Bid Date. The submittal of the Bid constitutes acceptance of products and procedures specified as sufficient, adequate, and satisfactory for completion of the Contract.

3. **Written request.** Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the Architect at least seven (7) calendar days prior to the date for receipt of Bids.

4. **Addenda.** Any interpretation, correction or change of the Bidding Documents will be made by written Addendum. Interpretations, corrections or changes of the Bidding Documents made in any

other manner will not be binding, and Bidders shall not rely upon such interpretations, corrections and changes.

5. **Singular references.** Reference in the singular to an article, device, or piece of equipment shall include as many of such articles, devices, or pieces as are indicated in the Contract Documents or as are required to complete the installation.

6. **Utilities and runs.** The Bidder should assume that the exact locations of any underground or hidden utilities, underground fuel tanks, and any plumbing and electrical runs may be somewhat different from any location indicated in the surveys or Contract Documents.

7. **Division of Contract Documents.** The Contract Documents may be divided into parts, divisions, and sections for convenient organization and reference. Generally, there has been no attempt to divide the Specification sections into Work performed by the various building trades, any Work by separate contractors, or any Work required for separate facilities in of phases of the Project.

C. SUBSTITUTIONS

1. **Standard.** The materials, products, procedures and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance, and quality that must be met by any proposed substitution.

2. **Pre-Bid Substitutions are Not Allowed.** No substitution will be considered prior to receipt of Bids.

3. **Post-Bid substitutions.** After the Contract has been executed, the Snoqualmie Valley School District and the Architect may consider a written request for the substitution of material or products in place of those specified in the Contract Documents only under the circumstances as specified therein.

D. ADDENDA

1. **Written.** All Addenda will be written. They will be mailed, emailed, faxed delivered, and/or posted electronically with notice to those the Architect knows to have received a complete set of Bidding Documents.

2. **Copies.** Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

3. **Verification and acknowledgment of receipt.** Prior to bidding, each Bidder shall ascertain that it has received all Addenda issued. Each Bidder shall acknowledge its receipt of all Addenda in its Bid.

1.04 BIDDING PROCEDURE

A. FORM AND STYLE OF BIDS

1. **Form.** Bids (including any required attachments) shall be submitted on forms identical to the form included with the Bidding Documents. Bids on different forms may be rejected. Oral, email, or telephonic responses or modifications will not be considered to be Bids.

2. **Entries on the Bid form.** All blanks on the Bid form shall be filled in by typewriter or manually in ink.

3. **Words and figures.** Where so indicated by the makeup of the Bid form, sums shall be expressed in both words and figures; in case of discrepancy between the two and regardless of any statement to the contrary on the Bid form, *the amount written in figures shall govern and the words shall be used to determine any ambiguities in the figures*. Portions of the Bid form may require the addition of component bids to a total or the identification of component amounts within a total. In case of discrepancy between component amounts listed and their sum(s), the component amounts listed shall govern.

4. **Initial changes.** Any interlineation, alteration or erasure must be initialed by an authorized representative of the Bidder.

5. **Alternates and Unit Prices.** All requested Alternates and unit prices should be bid. The Snoqualmie Valley School District reserves the right, but is not obligated, to reject any Bid on which all requested Alternates or unit prices are not bid. If no change in the Base Bid is required for an Alternate, enter "*No Change.*" If there is no entry, it will be presumed that the Bidder has made no offer to accomplish this Alternate. If it is not otherwise clear from the Bid or nature of the Alternate, it will be presumed that the amount listed for an Alternate is an add rather than a deduct.

6. **No conditions.** The Bidder shall make no conditions or stipulations on the Bid form nor qualify its Bid in any other manner.

7. **Identity of Bidder.** The Bidder shall include in the specified location on the Bid form the legal name of the Bidder and, if requested, a description of the Bidder as a sole proprietor, a partnership, a joint venture, a corporation (including the state of incorporation), or another described form of legal entity. The Bid shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder, and provide other information requested.

8. **Bid amounts do not include sales tax.** The Bid shall include in the sum stated all taxes imposed by law, EXCEPT STATE AND LOCAL SALES TAX ON THE CONTRACT SUM.

9. **Bid breakdown.** The Bid form may contain, for the Snoqualmie Valley School District's accounting purposes only, a breakdown of some or all of the components included in the Base Bid.

B. POTENTIAL LISTING OF SUBCONTRACTORS

1. **Procedure.** On certain projects of the Snoqualmie Valley School District, the Bid form includes a requirement that certain Subcontractors be listed, and the list must be submitted to the Snoqualmie Valley School District as described in the bidding documents. In these circumstances, the Bidder must name the Subcontractor with whom the Bidder, if awarded the Contract, will subcontract ***directly*** (i.e., not lower-tier Subcontractors) for performance of the work of:

   (a) HVAC (heating, ventilation and air conditioning),

   (b) plumbing as described in RCW 18.106,

   (c) electrical work as described in RCW 19.28, and

   (d) structural steel installation,

   (e) rebar installation, and

   (f) any other categories of Work listed on the Subcontractor listing form(s).

TIMING: The listing of HVAC, plumbing, and electrical subcontractors shall occur within one hour of the published bid submittal time. The listing of structural steel installation and rebar installation subcontractors shall occur within forty-eight hours of the published bid submittal time. The listing of any other categories of Work listed on the Subcontractor listing form(s) shall occur as indicated on such forms or as otherwise described in the bidding documents.

SELF-PERFORMANCE: If the Bidder intends to self-perform any of these categories of Work, it must name itself for each such category of Work.

IF NO SUBCONTRACTORS: If there is no work to be performed by a HVAC, plumbing, electrical, structural steel installation, rebar installation, or other subcontractor category identified on the Bid form(s), the Bidder should insert "None" or "N/A" on the Bid form. If a category is left blank, that shall indicate that the Bidder believes that there is no Work to be performed by that trade.

MULTIPLE ENTRIES: The Bidder shall not list more than one (1) entity for a particular category of Work identified, unless a Subcontractor varies with an Alternate Bid, in which case the Bidder shall identify the Subcontractor to be used for the Alternate and the affected portion of the Work and otherwise make its Bid clear as to which subcontractor shall be utilized depending upon the selection of alternates.

MULTIPLE SUBMITTAL TIMES. In the event the Bidding Documents call for a second submittal time for receipt of alternate bids, and no additional Subcontractors are listed with such alternate bids, the Snoqualmie Valley School District will consider that there is no change in the Subcontractors from those listed with regard to the base Bid.

2. **Failure to Submit.** In accordance with RCW 39.30.060, failure of a Bidder to submit the names of such proposed heating, ventilation and air conditioning, plumbing, electrical, structural steel installation, and rebar installation Subcontractors or to name itself to perform such Work or the naming of two or more Subcontractors to perform the same Work in the time periods described above shall render the Bidder's Bid nonresponsive and, therefore, void.

3. **Requirement to Subcontract.** The Bidder, if awarded the Contract, will subcontract with the listed Subcontractor for performance of the portion of the Work designated on the Form of Proposal, subject to the provisions of the Contract for Construction and RCW 39.30.060. The Bidder shall not substitute a listed Subcontractor in furtherance of bid shopping or bid peddling.

4. **Replacement.** If a listed Subcontractor is unable to comply with any bondability, qualification, or other requirements of the Contract or Bidding Documents (including without limitation a finding of Subcontractor non-Responsibility), the Snoqualmie Valley School District may require the Bidder to replace the Subcontractor with a Subcontractor acceptable to the Snoqualmie Valley School District at no change in the Contract Sum or Contract Time.

5. **Subcontractor Standards.** Subcontractors shall meet contractual and technical qualifications standards, and provide specialized certification, licensing, and/or payment and performance bonding where specified.

C. BID SECURITY

1. **Purpose and procedure.** Each Bid shall be accompanied by a bid security payable to the Snoqualmie Valley School District in the form required in the Bidding Documents and equal to five percent (5%) of the Base Bid. The bid security constitutes a pledge that the Bidder will enter into the Contract with the Snoqualmie Valley School District in the form provided, in a timely manner, and on the terms stated in its Bid and will furnish in a timely manner the payment and performance bonds, certificates of insurance, Contractor's Construction Schedule, and all other documents

required in the Contract Documents. Should the Bidder fail or refuse to enter into the Contract or fail to furnish such documents, the amount of the bid security shall be forfeited to the Snoqualmie Valley School District as liquidated damages, not as a penalty. By submitting its Bid and bid security, the Bidder agrees that any forfeiture is a reasonable prediction at the time of Bid submittal of future damages to the Snoqualmie Valley School District.

2. **Form.** The bid security shall be in the form of a certified or bank cashier's check payable to the Snoqualmie Valley School District or a bid bond executed by a bonding company acceptable to the Snoqualmie Valley School District and licensed in the State of Washington on the form included with the Bidding Documents (if any) or on an acceptable and equivalent form. The Attorney-in-Fact who executes the bond on behalf of the surety shall be licensed to do business in the State of Washington and shall affix to the bond a certified and current copy of that person's Power of Attorney.

3. **Retaining Bid Security.** The Snoqualmie Valley School District will have the right to retain the Bid Security of Bidders to whom an award is being considered until the earliest of either (a) the Contract has been executed, and payment and performance bonds have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn, or (c) all Bids have been rejected.

4. **Return of Bid Security.** Within forty-five (45) days after the Bid Date, the Snoqualmie Valley School District will release or return Bid securities to Bidders whose Bids are not to be further considered in awarding the Contract. Bid securities of the three apparent low Bidders will be held until the Contract has been finally executed, after which all unforfeited Bid securities will be returned.

D. SUBMISSION OF BIDS

1. **Procedure.** 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 specified in the Advertisement or Invitation to Bidders 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.

2. **Deposit.** Bids shall be deposited at the designated location prior to the time and date for receipt of Bids indicated in the Advertisement or Invitation to Bid, or any extension thereof made by Addendum. Bids received after the time and date for receipt of Bids may be opened, retained unopened, or returned (open or unopened), all at the discretion of the Snoqualmie Valley School District.

3. **Responsibility.** The Bidder assumes full responsibility for timely delivery at the location designated for receipt of Bids.

4. **Form.** Oral, fax, telephonic, email, electronic, or telegraphic Bids are invalid and will not be considered.

E. MODIFICATION OR WITHDRAWAL OF BID

1. **After receipt time.** A Bid may not be modified, withdrawn or canceled by the Bidder during a forty-five (45) day period following the time and date designated for the receipt of Bids, and each Bidder so agrees by virtue of submitting its Bid.

2. **Before receipt time.** Prior to the time and date designated for receipt of Bids, any Bid submitted may be modified or withdrawn only by notice to the party receiving Bids at the place designated for

receipt of Bids. Such notice shall be in writing over the signature of the Bidder or by fax; if by fax, written confirmation over the signature of the Bidder shall be mailed and postmarked on or before the date and time set for receipt of Bids. The notice shall be worded so as not to reveal the amount of the original Bid. Email notice will not be considered. It shall be the Bidder's sole responsibility to verify that the notice has been received by the Snoqualmie Valley School District in time to be withdrawn before the Bid opening.

3. **Resubmittal.** Withdrawn Bids may be resubmitted up to the time designated for the receipt of Bids provided that they are then fully in conformance with these Instructions to Bidders.

4. **Bid security with resubmission.** Bid security shall be in an amount sufficient for the Bid as modified or resubmitted.

F. NOTICE

1. Notice or a request from a Bidder under these Instructions to Bidders must be in writing over the signature of the Bidder and delivered in person or by mail, email, express delivery, or fax. If the notice is by email or fax, written confirmation over the signature of the Bidder must be mailed and postmarked on or before the date and time set for the notice.

1.05 CONSIDERATION OF BIDS

A. OPENING OF BIDS: Unless stated otherwise in the Advertisement or Invitation to Bid or any Addendum, the properly identified Bids received on time will be opened publicly and will be read aloud. An abstract of the Base Bids and Alternate Bids, if any, will be made available to Bidders and other interested parties.

B. REJECTION OF BIDS: The Snoqualmie Valley School District shall have the right but not the obligation to reject any or all Bids for any reason or for no reason, to reject a Bid not accompanied by required Bid security or by other material or data required by the Bidding Documents, or to reject a Bid which is in any way incomplete or irregular.

C. ACCEPTANCE OF BID (AWARD)

1. **Owner.** The Snoqualmie Valley School District intends (but is not bound) to award a Contract to the lowest Responsible and Responsive Bidder, provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The Snoqualmie Valley School District has the right to waive any informality or irregularity in any Bid(s) received and to accept the Bid which, in its judgment, is in its own best interests.

2. **Alternates.** The Snoqualmie Valley School District shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Contract Documents or Bidding Documents, and to determine the low Bidder on the basis of the sum of the Base Bid and the Alternates (if any) accepted. The Snoqualmie Valley School District retains the right to accept Alternate Bid items at the price bid within forty-five (45) days after the Agreement is executed.

3. **Requirements for Award**. Before the Award, the lowest Responsive Bidder shall meet the Award Requirements.

D. BID PROTEST PROCEDURES

1. **Procedure.** A Bidder protesting for any reason the Bidding Documents; a bidding procedure; the Snoqualmie Valley School District's objection to the Bidder or a person or entity proposed by the Bidder, including but not limited to a finding of non-Responsibility; the rejection of a Bid; the award

of the Contract; or any other aspect arising from or relating in any way to the bidding or award or lack thereof, shall cause a written protest to be filed with the Snoqualmie Valley School District within two (2) business days of the event giving rise to the protest and, in any event, no later than two (2) business days after the date upon which Bids are opened. (Intermediate Saturdays, Sundays, and legal holidays are not counted.) The written protest shall include the name of the protesting Bidder, a detailed description of the specific factual and legal grounds for the protest, copies of all supporting documents, and the specific relief requested. The written protest shall be delivered to:

Ryan Stokes
Assistant Superintendent (CFO and COO)
Snoqualmie Valley School District No. 410
8001 Silva Avenue SE; P.O. Box 400
Snoqualmie Valley, Washington 98065
stokesr@svsd410.org

2. **Consideration.** Upon receipt of the written protest, the Snoqualmie Valley School District will consider the protest. The Snoqualmie Valley School District may, within three (3) business days of the Snoqualmie Valley School District's receipt of the protest, provide any other affected Bidder(s) the opportunity to respond in writing to the protest. If the protest is not resolved by mutual agreement of the protesting Bidder and the Snoqualmie Valley School District, the Superintendent of the Snoqualmie Valley School District or the Superintendent's designee will review the issues and promptly furnish a final and binding written decision to the protesting Bidder and any other affected Bidder(s) within six (6) business days of the Snoqualmie Valley School District's receipt of the protest. (If more than one (1) protest is filed, the Snoqualmie Valley School District's decision will be provided within six (6) business days of the Snoqualmie Valley School District's receipt of the last protest.) If no reply is received from the Snoqualmie Valley School District during the six (6) business-day period, the protest shall be deemed rejected.

3. **Waiver.** Failure to comply with these protest procedures will render a protest waived.

4. **Condition precedent.** Timely and proper compliance with and exhaustion of these protest procedures shall be a condition precedent to any otherwise permissible judicial consideration of a protest.

1.06 POST BID INFORMATION

A. INFORMATION FROM APPARENT LOW BIDDER

1. **Submittal.** Within twenty-four (24) hours of the Architect's request, the apparent low Bidder and any other Bidders so requested shall submit the following to the Architect and the Snoqualmie Valley School District:

(a) additional information regarding the use of their own forces and the use of subcontractors and suppliers;

(b) a properly executed Contractor's Qualification Statement on the form provided (unless otherwise required to be submitted at the time of the Bid);

(c) a letter or form from the Bidder's insurance company stating that the insurance required by the Contract Documents will become effective upon execution of the Contract;

(d) a letter or form from the Bidder's surety stating that the bond(s) required by the Contract Documents will become effective upon execution of the Contract;

(e) if requested by the Snoqualmie Valley School District, a detailed breakdown of the Bid in a form acceptable to the Snoqualmie Valley School District;

(f) the names of the persons or entities (including a designation of the Work to be performed with the Contractor's own forces, and the names of those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the Work;

(g) the proprietary names and the suppliers of the principal items or systems of materials and equipment proposed for the Work;

(h) a State Board of Education Form D-9, if requested; and

(i) a signed statement in accordance with RCW 9A.72.085 verifying under penalty of perjury that the bidder is in compliance with the responsible bidder criteria of RCW 39.04.350(1)(g).

Failure to provide any of the above information in a timely manner may constitute an event of breach permitting forfeiture of the Bid security.

2. **Responsibility.** The Bidder will be required to establish to the satisfaction of the Architect and the Snoqualmie Valley School District the reliability and Responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents as well as qualifications set forth in the Sections of the Project Manual pertaining to such proposed Subcontractor's respective trades. The Responsibility of the Bidder may be judged in part by the Responsibility of these proposed entities. The following will be considered:

   - The ability, capacity, and skill to perform the contract;
   - The character, integrity, reputation, judgment, experience, and efficiency of the Bidder;
   - Whether the Bidder can perform the contract within the time specified;
   - The quality of performance of previous contracts;
   - The previous and existing compliance by the Bidder with laws relating to the contract; and
   - Such other information as may be secured having a bearing on the decision to award the contract.

   CONSIDERATION. In considering a Bidder's Responsibility, a Bidder shall be deemed to be unqualified to perform the Contract if, after review and verification of the representations included upon the Contractor's Qualification Statement submitted by the Bidder, conditions such as, but not limited to, the following appear:

   (a) The Bidder does not have sufficient prior experience (or an acceptable substitute thereof, as described below) with projects of a similar nature in technical, managerial, and financial requirements to that in the present Contract being bid. In addition to such established contractors, a newly established contractor may be considered qualified if it has shown on the Contractor's Qualification Statement that it is staffed with sufficient technical, managerial, and financial personnel with prior experience in the nature of construction for which the Bids are invited.

   (b) The Bidder does not have sufficient capability to undertake the obligations of the Contract. A determination will be made when the Snoqualmie Valley School District's review of the probable cash flow needs of the Bidder for this Project (including payroll, cost of material and supplies, equipment rental costs, and any other direct or incidental costs of the Contract), concludes that the Bidder does not have sufficient financial resources to enable it to satisfy its financial obligations under the Contract.

   (c) The Bidder has submitted unrealistic unit prices as determined by other Bidders' unit prices for this Project.

   (d) The Bidder does not have sufficient staff, equipment, or plant available to perform the Contract. The Snoqualmie Valley School District's determination in this matter will be based upon that represented by Bidder in the Contractor's Qualification Statement.

(e) The Bidder has a history of unsatisfactory performance of contracts of this or similar nature, regardless of whether such contracts existed between the Snoqualmie Valley School District and the Bidder, or other parties.

- A determination of this nature will be made if the Snoqualmie Valley School District, after review of the Bidder previous work experience, determines that the Bidder's unsatisfactory performance has resulted predominantly from the Bidder's failure rather than a failure to perform by another party. The Snoqualmie Valley School District will give the Contractor an opportunity to explain such nonperformance's before any final determination is reached.
- A determination of failure to perform will be made if the Snoqualmie Valley School District is satisfied after review of the Bidder's prior experience, that the Bidder has failed to satisfy its obligations under past contracts and the Snoqualmie Valley School District cannot safely assume satisfactory performance of the Contract by the Bidder.
- In reaching its determination, the Snoqualmie Valley School District may consider statements of other parties to the prior unperformed contracts, as well as the representations of the Bidder on its Contractor's Qualification Statement.

3. **Subcontractors.** The Responsibility of the Bidder may be judged in part by the Responsibility of its Subcontractors. Bidders must verify Responsibility criteria for each first-tier Subcontractor. A Subcontractor of any tier that hires other Subcontractors must verify Responsibility criteria for each of its next lower-tier Subcontractors. Verification shall include that each Subcontractor, at the time of subcontract execution, is Responsible and possesses an electrical contractor license, if required by RCW 19.28, or an elevator contractor license, if required by RCW 70.87, and can obtain any payment and performance bonds required by the Bidding or Contract Documents.

4. **Request to Modify Criteria**. No later than ten (10) days prior to the Bid Date, a potential Bidder may request in writing that the Snoqualmie Valley School District modify the Responsibility criteria listed in clause (2) above or elsewhere in the Contract Documents or the Bidding Documents. The Snoqualmie Valley School District will evaluate the information submitted by the potential Bidder and respond before the Bid Date. If the evaluation results in a change of the criteria, the Snoqualmie Valley School District will issue an Addendum identifying the new criteria.

5. **Objection.** Prior to the Award of the Contract, the Architect will notify the Bidder in writing if either the Snoqualmie Valley School District or the Architect, after due investigation, has reasonable objection to the Bidder or a person or entity proposed by the Bidder, and the Snoqualmie Valley School District will provide the reasons for the determination. The Bidder may appeal the determination within two (2) business days of its receipt of the objection by presenting additional information to the Snoqualmie Valley School District, and the Snoqualmie Valley School District will consider the additional information before issuing its final determination. The Bidder may, after the Snoqualmie Valley School District's objection or determination, and at Bidder's option, (1) withdraw the Bid, (2) submit an acceptable substitute person or entity with no change in the Contract Time and no adjustment in the Base Bid or any Alternate Bid, even if there is a cost to the Bidder occasioned by the substitution, or (3) appeal by filing a protest in accordance with paragraph 1.05.D. In the event of withdrawal, Bid security will not be forfeited.

6. **Change.** Persons and entities proposed by the Bidder and to whom the Snoqualmie Valley School District or the 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 Snoqualmie Valley School District and the Architect.

7. **Right to Terminate.** The Bidder's representations concerning its qualifications will be construed as a covenant under the Contract. Should it appear that the Bidder has made a material misrepresentation on its Contractor's Qualification Statement, the Snoqualmie Valley School District shall have the right to terminate the Contract for cause for the Contractor's breach, and the

Snoqualmie Valley School District may then pursue such remedies as exist elsewhere under this Contract, or as otherwise are provided at law or equity.

B. INFORMATION FROM OTHER BIDDERS: All other Bidders designated by the Architect as under consideration for award of a Contract shall also provide a properly executed Contractor's Qualification Statement, if so requested by the Snoqualmie Valley School District.

C. BIDDING MISTAKES: The Snoqualmie Valley School District will not be obligated to consider notice of claimed bidding mistakes received more than three (3) business days after the Bid opening. In accordance with Washington law, a low Bidder that claims error and fails to enter into the Contract is prohibited from bidding on the Project if a subsequent call for Bids is made for the Project.

1.07 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

A. BOND REQUIREMENTS: Within twenty-four (24) hours after the issuance of the Snoqualmie Valley School District's notice of intent to award the Contract, and prior to the date of execution of the Contract, the Bidder shall furnish evidence satisfactory to the Snoqualmie Valley School District of its ability to obtain statutory bonds pursuant to RCW 39.08 covering the faithful performance of the Contract and the payment of all obligations arising thereunder in the form and amount prescribed in the Contract Documents. The cost of such bond shall be included in the Base Bid.

B. SUBCONTRACTOR BONDS. The Snoqualmie Valley School District reserves the right to require certain Subcontractors to furnish performance and labor and material payment bonds in form as set forth herein and as set forth under the Bidding Documents or Contract Documents. The Snoqualmie Valley School District shall not, however, be responsible for any costs for any Subcontractor bonds unless the Snoqualmie Valley School District, prior to the execution of the Owner-Contractor Agreement, requires the Bidder, in writing, to furnish such bonds from designated Subcontractors. Should any bonds be furnished by subcontract bidders, or be required by any Bidder to be furnished by any subcontract bidder or Subcontractor, without the written request of the Snoqualmie Valley School District prior to the execution of the Owner-Contractor Agreement, the costs for any such bonds shall be at the expense of the Bidder and shall not be added to the Contract Sum.

C. TIME OF DELIVERY AND FORM OF BONDS. The Bidder shall deliver the bonds and other documents required by the Contract Documents to the Snoqualmie Valley School District pursuant to the Contract Documents and in no event any later than seven (7) days after the date of execution of the Contract and prior to commencing operations at the site. The bonds shall be written in the form approved by the Snoqualmie Valley School District for public work, as required by RCW 39.08. The bonds shall be written by a surety firm licensed to do business in the State of Washington, with an A.M. Best rating of at least A/VIII. The Bidder shall require the Attorney-in-Fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of that person's Power of Attorney.

1.08 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

A. FORM TO BE USED: The Agreement for the Work will be written on the form(s) contained in the Bidding Documents, including any General, Supplemental or Special Conditions, and the other Contract Documents included with the Project Manual. In the event no form is enclosed, an AIA Document A101-2017, "Standard Form of Agreement Between Owner and Contractor, where the basis of payment is a Stipulated Sum," along with the General Conditions (AIA Document A201-2017), as both are revised, modified and supplemented by the Snoqualmie Valley School District, will be used. All references in these Instructions to Bidders to the A101, A201, or other Contract Documents refer to the documents as revised by the Snoqualmie Valley School District.

B. CONFLICTS: In case of conflict between the provisions of these Instructions and any other Bidding Document, these Instructions shall govern. In case of conflict between the provisions of the Bidding Documents and the Contract Documents, the Contract Documents shall govern.

1.09 CONTRACT DOCUMENTS

This paragraph contains descriptions of some but not all of the provisions of the Contract Documents.

A. RETAINAGE: The Contract Documents specify the statutory retainage requirements of RCW 60.28 for this Project.

B. CONTRACT TIME: The Contract Documents specify the Contract Time. Timely completion of this Project is essential to the Snoqualmie Valley School District.

C. PREVAILING WAGES: The Contract Documents contain requirements regarding the payment of prevailing wages pursuant to RCW 39.12.

D. WRITTEN CLAIMS AND NOTICE: The Contract Documents contain a number of provisions that require the Contractor to provide notice of Claims and to make and support Claims, in writing, within a specified time in order to maintain the Claim. The Snoqualmie Valley School District is under no obligation to consider Claims that fail, in any respect, to meet these requirements.

E. CHANGES IN CONTRACT SUM: The Contract Documents contain provisions specifying requirements for and pricing of changes in the Contract Sum.

F. DISPUTE RESOLUTION: The Contract Documents contain alternative dispute resolution procedures which, among other things, requires non-binding mediation of all disputes.

G. CONTRACTOR REGISTRATION: Pursuant to RCW 39.06, the Bidder shall be registered or licensed as required by the laws of the State of Washington, including but not limited to, RCW 18.27.

H. COMMISSIONING OF OPERATIONAL SYSTEMS: Certain systems may be designated in the Contract Documents as "Operational Systems." If so, prior to the Date of Substantial Completion the Operational Systems must be up and running, ready for normal operation, and subject to a pre-commissioning inspection.

I. TAXES. The Contractor shall include in its Bid and pay for all applicable taxes except Washington State Sales Tax and Local Sales Tax on the Contract Sum, which shall be excluded in the preparation of its Bid. Such State and Local Sales Taxes shall be added to the Contract Sum, paid by the Snoqualmie Valley School District to the Contractor, and then paid by the Contractor over the course of the Project. Refer to general, supplementary or other conditions regarding further information.

J. ACCESS TO PREMISES. Any prospective Bidders or Subcontractors who wish to enter the premises must first notify both the Owner's Representative and either the school principal or Plant Department and make known their presence.

K. OTHER PROVISIONS: The above paragraphs contain descriptions of some but not all of the provisions of the Contract Documents. Bidders should review in detail the Contract Documents themselves and not rely upon the above paragraphs in this article as complete or inclusive.

1.10 POSSIBLE TRENCH EXCAVATION SAFETY PROVISIONS

A. To ensure that the Bidder agrees to comply with relevant trenching safety requirements of RCW 39.04.180 and RCW 49.17, the Base Bid must include the cost of any required trench safety provisions.

The Bidder shall enter in the blank (if any) provided on the Bid form the dollar amount the Bidder has included in its Base Bid for any trench safety provisions for trenching that will exceed a depth of four feet. If trench excavation safety provisions do not pertain to the Project, the Bidder should enter "N.A." or "Not Applicable" in the blank (if any) on the Bid form.

END OF SECTION

DOCUMENT 00 31 19 - EXISTING CONDITION INFORMATION

1.1 EXISTING CONDITION INFORMATION

A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of the Bidders' own investigations. They are made available for Bidders' convenience and information but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.

B. Survey information that includes information on existing conditions, is available for viewing upon request.

C. Related Requirements:

1. Document 00 21 13 "Instructions to Bidders" for the Bidder's responsibilities for examination of Project site and existing conditions.

END OF DOCUMENT 00 31 19

DOCUMENT 00 31 19 – APPENDIX A

Following this page, See report:

"TOTAL METAL ANALYSIS” for testing for lead in paint dated October 18, 2024 conducted by NVL Labs. (Note: All samples show levels less than maximum acceptable levels per CPSC for paint.)

DOCUMENT 00 31 19 – APPENDIX B

Following this page and appendix A, See report:

"BULK ASBESTOS FIBER ANALYSIS” for testing for asbestos dated October 22, 2024 conducted by NVL Labs. (Note: All samples are marked as “None Detected”.)

October 18, 2024

Christina Anderson
Terracon - Mountlake Terrace
21905 64th Ave. W #100
Mountlake Terrace, WA 98043

NVL Batch # 2418849.00

RE: Total Metal Analysis
Method: EPA 7000B Lead by FAA <paint>
Item Code: FAA-02

Client Project: 81247645
Location: Snoqualmie Valley ECC

Dear Ms. Anderson,

NVL Labs received 4 sample(s) for the said project on 10/17/2024. Preparation of these samples was conducted following protocol outlined in EPA 3051/7000B , unless stated otherwise. Analysis of these samples was performed using analytical instruments in accordance with EPA 7000B Lead by FAA <paint>. The results are usually expressed in mg/Kg and percentage (%). Test results are not blank corrected.

For recent regulation updates pertaining to current regulatory levels or permissible exposure levels, please call your local regulatory agencies for more detail.

At NVL Labs all analyses are performed under strict guidelines of the Quality Assurance Program. If samples were collected by the customer, then the reported test results apply only to the samples as received by NVL Labs. This report is considered highly confidential and will not be released without your approval. Samples are archived after two weeks from the analysis date. Please feel free to contact us at 206-547-0100, in case you have any questions or concerns.

Sincerely,

Shalini Patel, Manager Metals/Org Laboratory

Enc.: Sample results

Phone: 206 547.0100 | Fax: 206 634.1936 | Toll Free: 1.888.NVL.LABS (685.5227)
4708 Aurora Avenue North | Seattle, WA 98103-6516

Analysis Report

Total Lead (Pb)

Client: Terracon - Mountlake Terrace
Address: 21905 64th Ave. W #100
Mountlake Terrace, WA 98043

Attention: **Ms. Christina Anderson**
Project Location: Snoqualmie Valley ECC

Batch #: 2418849.00
Matrix: Paint
Method: EPA 3051/7000B
Client Project #: 81247645
Date Received: 10/17/2024
Samples Received: 4
Samples Analyzed: 4

Lab ID	Client Sample #	Sample Weight (g)	RL in mg/Kg	Results in mg/Kg	Results in percent
24112400	ECC-Pb-01	0.1960	51	< 51	<0.0051
24112401	ECC-Pb-02	0.1902	53	< 53	<0.0053
24112402	ECC-Pb-03	0.1904	53	< 53	<0.0053
24112403	ECC-Pb-04	0.1849	54	< 54	<0.0054

Sampled by: Client
Analyzed by: Yasuyuki Hida
Reviewed by: Shalini Patel

Date Analyzed: 10/18/2024
Date Issued: 10/18/2024

Shalini Patel, Manager Metals/Org Laboratory

mg/ Kg =Milligrams per kilogram
Percent = Milligrams per kilogram / 10000
Note : Method QC results are acceptable unless stated otherwise.
Unless otherwise indicated, the condition of all samples was acceptable at time of receipt.

RL = Reporting Limit
'<' = Below the reporting Limit

Bench Run No: 2024-1018-04
FAA-02

LEAD LABORATORY SERVICES

Company	Terracon - Mountlake Terrace	**NVL Batch Number**	**2418849.00**
Address	21905 64th Ave. W #100 Mountlake Terrace, WA 98043	**TAT** 3 Days **AH** No **Rush TAT**	
Project Manager	Ms. Christina Anderson	**Due Date** 10/22/2024 **Time** 11:40 AM	
Phone	(425) 771-3304	**Email**	christina.anderson@terracon.com
Cell	(360) 303-7452	**Fax**	(425) 771-3549

Project Name/Number: 81247645 **Project Location:** Snoqualmie Valley ECC

Subcategory Flame AA (FAA)

Item Code FAA-02 EPA 7000B Lead by FAA <paint>

Total Number of Samples 4 Rush Samples

	Lab ID	Sample ID	Description	A/R
1	24112400	ECC-Pb-01		A
2	24112401	ECC-Pb-02		A
3	24112402	ECC-Pb-03		A
4	24112403	ECC-Pb-04		A

	Print Name	Signature	Company	Date	Time
Sampled by	Client				
Relinquished by	Client				

Office Use Only	Print Name	Signature	Company	Date	Time
Received by	Kelly AuVu		NVL	10/17/24	1140
Analyzed by	Yasuyuki Hida		NVL	10/18/24	
Results Called by					
☐ **Faxed** ☐ **Emailed**					

Special Instructions:

Date: 10/17/2024
Time: 12:27 PM
Entered By: Kelly AuVu

2418849

NVL LABS
HAZARDOUS MATERIALS SERVICES

METALS CHAIN OF CUSTODY

❑ 2 Hour ❑ 4 Hours ❑ 24 Hours
❑ 2 Days ☒ 3 Days ❑ 4 Days
❑ 5 Days ❑ 6-10 Days
Please call for TAT less than 24 Hours

Project Manager And Staff
- ☒ Christina Anderson 360.303.7452 Christina.Anderson@terracon.com
- ☒ John McCaslin 206.795.1338 John.McCaslin@terracon.com
- ❑ Scott Parker 206.714.7152 Scott.Parker@terracon.com
- ❑ Joel Whelchel 951-990-0983 Joel.Whelchel@terracon.com
- ❑ Krista Anderson 972-310-4055 Krista.Anderson@terracon.com
- ❑ Bryn Honnold 425.293.3901 Bryn.Honnold@terracon.com
- ❑ Jacob Lindberg 425.697.1027 Jacob.Lindberg@terracon.com
- ❑ Daniel Sheppard 425.273.6046 Daniel.Sheppard@terracon.com
- ❑ Lydia Slugen 425.877.7054 Lydia.Slugen@terracon.com

Company Terracon
Address 21905 64th Ave W Suite 100
Mountlake Terrace, WA 98043
Phone 425-771-3304

Project Name/Number 81247615 | Project Location Snoqualmie Valley ECC

☒ Total Metals ❑ TCLP
☒ FAA (ppm) ❑ ICP (PPM) ❑ GFAA (ppb) ❑ CVAA (ppb)
❑ Air Filter ❑ Paint Chips (cm) ❑ Drinking Water ❑ Other
☒ Paint Chips (%) ❑ Dust Wipes ❑ Waste Water
❑ Soil

RCRA 8: ❑ Barium ❑ Chromium ❑ Silver ❑ Arsenic ❑ Mercury ☒ Lead ❑ Selenium ❑ Cadmium
RCRA 11: ❑ Cooper ❑ Zinc ❑ Other

Reporting Instructions EMAIL
❑ Call ( ) - ❑ Fax ( ) - ☑ Email See Above

Total Number of Samples 4

	Sample ID	Description	A/R
1	ECC-Pb-01	White on GWB	
2	-02	White on Wood	
3	-03	Gray on Wood	
4	-04	Beige on Wood	
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

	Print Name	Signature	Company	Date	Time
Sampled by	John McCaslin		Terracon	10/16/2024	
Relinquish by	John McCaslin		Terracon	10/17/2024	1140

Office Use Only

	Print Name	Signature	Company	Date	Time
Received by	Kenneth		NVL	10/17/24	1140
Analyzed by					
Called by					
Faxed/Email by					

October 22, 2024

Christina Anderson
Terracon - Mountlake Terrace
21905 64th Ave. W #100
Mountlake Terrace, WA 98043

RE: Bulk Asbestos Fiber Analysis; NVL Batch # 2418848.00

Client Project: 81247645
Location: Snoqualmie Valley ECC

Dear Ms. Anderson,

Enclosed please find test results for the 25 sample(s) submitted to our laboratory for analysis on 10/17/2024.

Examination of these samples was conducted for the presence of identifiable asbestos fibers using polarized light microscopy (PLM) with dispersion staining in accordance with **U. S. EPA 40 CFR Appendix E to Subpart E of Part 763**, Interim Method for the Determination of Asbestos in Bulk Insulation Samples and **EPA 600/R-93/116**, Method for the Determination of Asbestos in Bulk Building Materials.

For samples containing more than one separable layer of materials, the report will include findings for each layer (labeled Layer 1 and Layer 2, etc. for each individual layer). The asbestos concentration in the sample is determined by calibrated visual estimation.

For those samples with asbestos concentrations between 1 and 10 percent based on visual estimation, the EPA recommends a procedure known as point counting (NESHAPS, 40 CFR Part 61). Point counting is a statistically more accurate means of quantification for samples with low concentrations of asbestos.

The detection limit for the calibrated visual estimation is <1%, 400 point counts is 0.25% and 1000 point counts is 0.1%

Samples are archived for two weeks following analysis. Samples that are not retrieved by the client are discarded after two weeks.

Thank you for using our laboratory services. Please do not hesitate to call if there is anything further we can assist you with.

Sincerely,

Hilary Crumley, Manager Asbestos Laboratory

NVLAP Testing
Lab Code: 102063-0

Enc.: Sample Results

Phone: 206 547.0100 | Fax: 206 634.1936 | Toll Free: 1.888.NVL.LABS (685.5227)
4708 Aurora Avenue North | Seattle, WA 98103-6516

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: Terracon - Mountlake Terrace
Address: 21905 64th Ave. W #100
Mountlake Terrace, WA 98043

Attention: **Ms. Christina Anderson**
Project Location: Snoqualmie Valley ECC

Batch #: 2418848.00
Client Project #: 81247645
Date Received: 10/17/2024
Samples Received: 25
Samples Analyzed: 25
Method: EPA/600/R-93/116

Lab ID: 24112375 **Client Sample #: ECC-01A**

Location: Snoqualmie Valley ECC

Layer 1 of 1 **Description:** White chalky material with paper

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Gypsum/Binder, Fine grains, Calcareous particles	Cellulose 17%	**None Detected ND**
	Glass fibers 6%	

Lab ID: 24112376 **Client Sample #: ECC-01B**

Location: Snoqualmie Valley ECC

Layer 1 of 3 **Description:** Light yellow brittle mastic

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Mastic, Fine particles	None Detected ND	**None Detected ND**

Layer 2 of 3 **Description:** White compacted powdery material with yellow fibrous mesh

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Binder/Filler, Fine grains, Fine particles	Glass fibers 14%	**None Detected ND**

Layer 3 of 3 **Description:** White chalky material with paper

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Gypsum/Binder, Fine grains, Calcareous particles	Cellulose 15%	**None Detected ND**
	Glass fibers 9%	

Lab ID: 24112377 **Client Sample #: ECC-01C**

Location: Snoqualmie Valley ECC

Layer 1 of 3 **Description:** Light yellow brittle mastic

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Mastic, Fine particles	None Detected ND	**None Detected ND**

Sampled by: Client
Analyzed by: Akane Yoshikawa **Date:** 10/22/2024
Reviewed by: Hilary Crumley **Date:** 10/22/2024

Hilary Crumley, Manager Asbestos Laboratory

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and EPA 40 CFR Appendix E to Subpart E of Part 763 with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: Terracon - Mountlake Terrace
Address: 21905 64th Ave. W #100
Mountlake Terrace, WA 98043

Attention: **Ms. Christina Anderson**
Project Location: Snoqualmie Valley ECC

Batch #: 2418848.00
Client Project #: 81247645
Date Received: 10/17/2024
Samples Received: 25
Samples Analyzed: 25
Method: EPA/600/R-93/116

Layer 2 of 3	**Description:** White compacted powdery material with yellow fibrous mesh		
	Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
	Binder/Filler, Fine grains, Fine particles	Glass fibers 11%	**None Detected ND**
Layer 3 of 3	**Description:** White chalky material with paper		
	Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
	Gypsum/Binder, Fine grains, Calcareous particles	Cellulose 16%	**None Detected ND**
		Glass fibers 7%	

Lab ID: 24112378 **Client Sample #: ECC-02A**

Location: Snoqualmie Valley ECC

Layer 1 of 2	**Description:** White fibrous mesh with silver foil and paper		
	Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
	Binder/Filler, Fine particles, Metal foil	Cellulose 29%	**None Detected ND**
		Glass fibers 12%	
Layer 2 of 2	**Description:** Pink fibrous material		
	Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
	Binder/Filler	Glass fibers 98%	**None Detected ND**

Lab ID: 24112379 **Client Sample #: ECC-02B**

Location: Snoqualmie Valley ECC

Layer 1 of 2	**Description:** White fibrous mesh with silver foil and paper		
	Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
	Binder/Filler, Fine particles, Metal foil	Cellulose 28%	**None Detected ND**
		Glass fibers 17%	

Sampled by: Client
Analyzed by: Akane Yoshikawa **Date:** 10/22/2024
Reviewed by: Hilary Crumley **Date:** 10/22/2024

Hilary Crumley, Manager Asbestos Laboratory

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and EPA 40 CFR Appendix E to Subpart E of Part 763 with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: Terracon - Mountlake Terrace
Address: 21905 64th Ave. W #100
Mountlake Terrace, WA 98043

Attention: **Ms. Christina Anderson**
Project Location: Snoqualmie Valley ECC

Batch #: 2418848.00
Client Project #: 81247645
Date Received: 10/17/2024
Samples Received: 25
Samples Analyzed: 25
Method: EPA/600/R-93/116

Layer 2 of 2	**Description:** Pink fibrous material		
	Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
	Binder/Filler	Glass fibers 96%	**None Detected ND**

Lab ID: 24112380 **Client Sample #: ECC-02C**

Location: Snoqualmie Valley ECC

Layer 1 of 2	**Description:** White fibrous mesh with silver foil and paper		
	Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
	Binder/Filler, Fine particles, Metal foil	Cellulose 28%	**None Detected ND**
		Glass fibers 17%	
Layer 2 of 2	**Description:** Pink fibrous material		
	Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
	Binder/Filler	Glass fibers 98%	**None Detected ND**

Lab ID: 24112381 **Client Sample #: ECC-03A**

Location: Snoqualmie Valley ECC

Layer 1 of 1	**Description:** Beige fibrous material with white paint		
	Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
	Binder/Filler, Pumice, Glass beads	Cellulose 31%	**None Detected ND**
	Fine particles, Paint	Glass fibers 22%	

Lab ID: 24112382 **Client Sample #: ECC-03B**

Location: Snoqualmie Valley ECC

Layer 1 of 1	**Description:** Beige fibrous material with white paint		
	Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
	Binder/Filler, Pumice, Glass beads	Cellulose 33%	**None Detected ND**
	Fine particles, Paint	Glass fibers 18%	

Sampled by: Client
Analyzed by: Akane Yoshikawa **Date:** 10/22/2024
Reviewed by: Hilary Crumley **Date:** 10/22/2024

Hilary Crumley, Manager Asbestos Laboratory

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and EPA 40 CFR Appendix E to Subpart E of Part 763 with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: Terracon - Mountlake Terrace
Address: 21905 64th Ave. W #100
Mountlake Terrace, WA 98043

Attention: **Ms. Christina Anderson**
Project Location: Snoqualmie Valley ECC

Batch #: 2418848.00
Client Project #: 81247645
Date Received: 10/17/2024
Samples Received: 25
Samples Analyzed: 25
Method: EPA/600/R-93/116

Lab ID: 24112383 **Client Sample #: ECC-03C**
Location: Snoqualmie Valley ECC
Layer 1 of 1 **Description:** Beige fibrous material with white paint

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Binder/Filler, Pumice, Glass beads	Cellulose 32%	**None Detected ND**
Fine particles, Paint	Glass fibers 19%	

Lab ID: 24112384 **Client Sample #: ECC-04A**
Location: Snoqualmie Valley ECC
Layer 1 of 1 **Description:** White soft elastic material

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Binder/Filler, Fine particles	None Detected ND	**None Detected ND**

Lab ID: 24112385 **Client Sample #: ECC-04B**
Location: Snoqualmie Valley ECC
Layer 1 of 1 **Description:** White soft elastic material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Binder/Filler, Fine particles, Paint	Polyethylene fibers 5%	**None Detected ND**

Lab ID: 24112386 **Client Sample #: ECC-04C**
Location: Snoqualmie Valley ECC
Layer 1 of 1 **Description:** White soft elastic material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Binder/Filler, Fine particles, Paint	None Detected ND	**None Detected ND**

Lab ID: 24112387 **Client Sample #: ECC-05A**
Location: Snoqualmie Valley ECC

Sampled by: Client
Analyzed by: Akane Yoshikawa **Date:** 10/22/2024
Reviewed by: Hilary Crumley **Date:** 10/22/2024

Hilary Crumley, Manager Asbestos Laboratory

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and EPA 40 CFR Appendix E to Subpart E of Part 763 with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: Terracon - Mountlake Terrace
Address: 21905 64th Ave. W #100
Mountlake Terrace, WA 98043

Attention: **Ms. Christina Anderson**
Project Location: Snoqualmie Valley ECC

Batch #: 2418848.00
Client Project #: 81247645
Date Received: 10/17/2024
Samples Received: 25
Samples Analyzed: 25
Method: EPA/600/R-93/116

Layer 1 of 1 **Description:** White compacted powdery material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Binder/Filler, Fine grains, Fine particles	None Detected ND	**None Detected ND**
Paint		

Lab ID: 24112388 **Client Sample #: ECC-05B**

Location: Snoqualmie Valley ECC

Layer 1 of 1 **Description:** White compacted powdery material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Binder/Filler, Fine particles, Paint	None Detected ND	**None Detected ND**

Lab ID: 24112389 **Client Sample #: ECC-05C**

Location: Snoqualmie Valley ECC

Layer 1 of 1 **Description:** White compacted powdery material with paper & paint

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Binder/Filler, Fine grains, Fine particles	Cellulose 13%	**None Detected ND**
Paint		

Lab ID: 24112390 **Client Sample #: ECC-06A**

Location: Snoqualmie Valley ECC

Layer 1 of 3 **Description:** White compacted powdery material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Binder/Filler, Fine grains, Fine particles	None Detected ND	**None Detected ND**
Paint		

Layer 2 of 3 **Description:** White compacted powdery material with paper

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Binder/Filler, Fine grains, Fine particles	Cellulose 11%	**None Detected ND**

Sampled by: Client
Analyzed by: Akane Yoshikawa **Date:** 10/22/2024
Reviewed by: Hilary Crumley **Date:** 10/22/2024

Hilary Crumley, Manager Asbestos Laboratory

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and EPA 40 CFR Appendix E to Subpart E of Part 763 with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: Terracon - Mountlake Terrace
Address: 21905 64th Ave. W #100
Mountlake Terrace, WA 98043

Attention: **Ms. Christina Anderson**
Project Location: Snoqualmie Valley ECC

Batch #: 2418848.00
Client Project #: 81247645
Date Received: 10/17/2024
Samples Received: 25
Samples Analyzed: 25
Method: EPA/600/R-93/116

Layer 3 of 3 **Description:** White chalky material with paper

Non-Fibrous Materials:	Other Fibrous Materials:	%	**Asbestos Type: %**
Gypsum/Binder, Fine grains, Calcareous particles	Cellulose	14%	**None Detected ND**
	Glass fibers	6%	

Lab ID: 24112391 **Client Sample #: ECC-06B**

Location: Snoqualmie Valley ECC

Layer 1 of 3 **Description:** White compacted powdery material with paint

Non-Fibrous Materials:	Other Fibrous Materials:	%	**Asbestos Type: %**
Binder/Filler, Fine grains, Fine particles	None Detected	ND	**None Detected ND**
Paint			

Layer 2 of 3 **Description:** White compacted powdery material with paper

Non-Fibrous Materials:	Other Fibrous Materials:	%	**Asbestos Type: %**
Binder/Filler, Fine grains, Fine particles	Cellulose	9%	**None Detected ND**

Layer 3 of 3 **Description:** White chalky material with paper

Non-Fibrous Materials:	Other Fibrous Materials:	%	**Asbestos Type: %**
Gypsum/Binder, Fine grains, Calcareous particles	Cellulose	17%	**None Detected ND**
	Glass fibers	6%	

Lab ID: 24112392 **Client Sample #: ECC-06C**

Location: Snoqualmie Valley ECC

Layer 1 of 3 **Description:** White compacted powdery material with paint

Non-Fibrous Materials:	Other Fibrous Materials:	%	**Asbestos Type: %**
Binder/Filler, Fine grains, Fine particles	None Detected	ND	**None Detected ND**
Paint			

Sampled by: Client
Analyzed by: Akane Yoshikawa **Date:** 10/22/2024
Reviewed by: Hilary Crumley **Date:** 10/22/2024

Hilary Crumley, Manager Asbestos Laboratory

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and EPA 40 CFR Appendix E to Subpart E of Part 763 with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: Terracon - Mountlake Terrace
Address: 21905 64th Ave. W #100
Mountlake Terrace, WA 98043

Attention: **Ms. Christina Anderson**
Project Location: Snoqualmie Valley ECC

Batch #: 2418848.00
Client Project #: 81247645
Date Received: 10/17/2024
Samples Received: 25
Samples Analyzed: 25
Method: EPA/600/R-93/116

Layer 2 of 3	**Description:** White compacted powdery material with paper			
	Non-Fibrous Materials:	Other Fibrous Materials:	%	**Asbestos Type: %**
	Binder/Filler, Fine grains, Fine particles	Cellulose	11%	**None Detected ND**
Layer 3 of 3	**Description:** White chalky material with paper			
	Non-Fibrous Materials:	Other Fibrous Materials:	%	**Asbestos Type: %**
	Gypsum/Binder, Fine grains, Calcareous particles	Cellulose	17%	**None Detected ND**
		Glass fibers	5%	

Lab ID: 24112393 **Client Sample #: ECC-07A**
Location: Snoqualmie Valley ECC

Layer 1 of 1	**Description:** Yellow soft mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:	%	**Asbestos Type: %**
	Mastic, Fine particles	None Detected	ND	**None Detected ND**

Lab ID: 24112394 **Client Sample #: ECC-07B**
Location: Snoqualmie Valley ECC

Layer 1 of 2	**Description:** Yellow soft mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:	%	**Asbestos Type: %**
	Mastic, Fine particles	None Detected	ND	**None Detected ND**
Layer 2 of 2	**Description:** White compacted powdery material with paint			
	Non-Fibrous Materials:	Other Fibrous Materials:	%	**Asbestos Type: %**
	Binder/Filler, Fine grains, Fine particles	None Detected	ND	**None Detected ND**
	Paint			

Lab ID: 24112395 **Client Sample #: ECC-07C**
Location: Snoqualmie Valley ECC

Sampled by: Client
Analyzed by: Akane Yoshikawa **Date:** 10/22/2024
Reviewed by: Hilary Crumley **Date:** 10/22/2024

Hilary Crumley, Manager Asbestos Laboratory

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and EPA 40 CFR Appendix E to Subpart E of Part 763 with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: Terracon - Mountlake Terrace
Address: 21905 64th Ave. W #100
Mountlake Terrace, WA 98043

Attention: **Ms. Christina Anderson**
Project Location: Snoqualmie Valley ECC

Batch #: 2418848.00
Client Project #: 81247645
Date Received: 10/17/2024
Samples Received: 25
Samples Analyzed: 25
Method: EPA/600/R-93/116

Layer 1 of 1	**Description:** Yellow soft mastic		
	Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
	Mastic, Fine particles, Wood flakes	Cellulose 3%	**None Detected ND**

Lab ID: 24112396 **Client Sample #: ECC-08A**
Location: Snoqualmie Valley ECC

Layer 1 of 2	**Description:** White brittle fibrous material		
	Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
	Binder/Filler, Fine particles	Glass fibers 32%	**None Detected ND**
Layer 2 of 2	**Description:** Yellow brittle mastic		
	Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
	Mastic, Fine particles	None Detected ND	**None Detected ND**

Lab ID: 24112397 **Client Sample #: ECC-09A**
Location: Snoqualmie Valley ECC

Layer 1 of 4	**Description:** Black asphaltic fibrous material with granules		
	Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
	Asphalt/Binder, Granules, Fine grains	Glass fibers 43%	**None Detected ND**
Layer 2 of 4	**Description:** Black asphaltic mastic		
	Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
	Asphalt/Binder, Fine particles	None Detected ND	**None Detected ND**
Layer 3 of 4	**Description:** Black asphaltic fibrous material with granules		
	Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
	Asphalt/Binder, Granules, Fine grains	Glass fibers 47%	**None Detected ND**
Layer 4 of 4	**Description:** Black asphaltic mastic		
	Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
	Asphalt/Binder, Fine particles	None Detected ND	**None Detected ND**

Sampled by: Client
Analyzed by: Akane Yoshikawa **Date:** 10/22/2024
Reviewed by: Hilary Crumley **Date:** 10/22/2024

Hilary Crumley, Manager Asbestos Laboratory

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and EPA 40 CFR Appendix E to Subpart E of Part 763 with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: Terracon - Mountlake Terrace
Address: 21905 64th Ave. W #100
Mountlake Terrace, WA 98043

Attention: Ms. Christina Anderson
Project Location: Snoqualmie Valley ECC

Batch #: 2418848.00
Client Project #: 81247645
Date Received: 10/17/2024
Samples Received: 25
Samples Analyzed: 25
Method: EPA/600/R-93/116

Lab ID: 24112398 **Client Sample #: ECC-09B**

Location: Snoqualmie Valley ECC

Layer 1 of 3	**Description:** Black asphaltic fibrous material with granules			
	Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
	Asphalt/Binder, Granules, Fine grains	Glass fibers	48%	**None Detected ND**
Layer 2 of 3	**Description:** Black asphaltic mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
	Asphalt/Binder, Fine particles	None Detected	ND	**None Detected ND**
Layer 3 of 3	**Description:** Black asphaltic fibrous material with granules			
	Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
	Asphalt/Binder, Granules, Fine grains	Glass fibers	44%	**None Detected ND**

Lab ID: 24112399 **Client Sample #: ECC-09C**

Location: Snoqualmie Valley ECC

Layer 1 of 3	**Description:** Black asphaltic fibrous material with granules			
	Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
	Asphalt/Binder, Granules, Fine grains	Glass fibers	51%	**None Detected ND**
Layer 2 of 3	**Description:** Black asphaltic mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
	Asphalt/Binder, Fine particles	None Detected	ND	**None Detected ND**
Layer 3 of 3	**Description:** Black asphaltic fibrous material with granules			
	Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
	Asphalt/Binder, Granules, Fine grains	Glass fibers	47%	**None Detected ND**

Sampled by: Client
Analyzed by: Akane Yoshikawa **Date:** 10/22/2024
Reviewed by: Hilary Crumley **Date:** 10/22/2024

Hilary Crumley, Manager Asbestos Laboratory

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and EPA 40 CFR Appendix E to Subpart E of Part 763 with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

ASBESTOS LABORATORY SERVICES

NVL

Company Terracon - Mountlake Terrace
Address 21905 64th Ave. W #100
Mountlake Terrace, WA 98043
Project Manager Ms. Christina Anderson
Phone (425) 771-3304
Cell (360) 303-7452

NVL Batch Number **2418848.00**
TAT 3 Days **AH** No
Rush TAT
Due Date 10/22/2024 **Time** 11:40 AM
Email christina.anderson@terracon.com
Fax (425) 771-3549

Project Name/Number: 81247645 **Project Location:** Snoqualmie Valley ECC

Subcategory PLM Bulk
Item Code ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

Total Number of Samples 25 Rush Samples

	Lab ID	Sample ID	Description	A/R
1	24112375	ECC-01A		A
2	24112376	ECC-01B		A
3	24112377	ECC-01C		A
4	24112378	ECC-02A		A
5	24112379	ECC-02B		A
6	24112380	ECC-02C		A
7	24112381	ECC-03A		A
8	24112382	ECC-03B		A
9	24112383	ECC-03C		A
10	24112384	ECC-04A		A
11	24112385	ECC-04B		A
12	24112386	ECC-04C		A
13	24112387	ECC-05A		A
14	24112388	ECC-05B		A
15	24112389	ECC-05C		A
16	24112390	ECC-06A		A
17	24112391	ECC-06B		A
18	24112392	ECC-06C		A

	Print Name	Signature	Company	Date	Time
Sampled by	Client				
Relinquished by	Client				

Office Use Only	Print Name	Signature	Company	Date	Time
Received by	Kelly AuVu		NVL	10/17/24	1140
Analyzed by	Akane Yoshikawa		NVL	10/22/24	
Results Called by					
☐ **Faxed** ☐ **Emailed**					

Special Instructions:

Date: 10/17/2024
Time: 12:20 PM
Entered By: Kelly AuVu

ASBESTOS LABORATORY SERVICES

Company	Terracon - Mountlake Terrace	**NVL Batch Number**	**2418848.00**
Address	21905 64th Ave. W #100 Mountlake Terrace, WA 98043	**TAT** 3 Days **AH** No **Rush TAT**	
Project Manager	Ms. Christina Anderson	**Due Date** 10/22/2024 **Time** 11:40 AM	
Phone	(425) 771-3304	**Email**	christina.anderson@terracon.com
Cell	(360) 303-7452	**Fax**	(425) 771-3549

Project Name/Number: 81247645 **Project Location:** Snoqualmie Valley ECC

Subcategory PLM Bulk

Item Code ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

Total Number of Samples 25 Rush Samples

	Lab ID	Sample ID	Description	A/R
19	24112393	ECC-07A		A
20	24112394	ECC-07B		A
21	24112395	ECC-07C		A
22	24112396	ECC-08A		A
23	24112397	ECC-09A		A
24	24112398	ECC-09B		A
25	24112399	ECC-09C		A

	Print Name	Signature	Company	Date	Time
Sampled by	Client				
Relinquished by	Client				

Office Use Only	Print Name	Signature	Company	Date	Time
Received by	Kelly AuVu		NVL	10/17/24	1140
Analyzed by	Akane Yoshikawa		NVL	10/22/24	
Results Called by					
☐ **Faxed** ☐ **Emailed**					

Special Instructions:

Date: 10/17/2024
Time: 12:20 PM
Entered By: Kelly AuVu

2418848 1 of 2

NVL LABS
INDUSTRIAL HYGIENE SERVICES
Laboratory | Management | Training

ASBESTOS CHAIN OF CUSTODY

- ☐ 1 Hour
- ☐ 2 Hours
- ☐ 4 Hours
- ☐ 24 Hours
- ~~☐ 3 Days~~
- ☐ 4 Days
- ☐ 5 Days
- ☐ 10 Days
- ☒ 3 Days

Please call for TAT less than 24 Hours

PM:	CC:	
☒	☐	Christina Anderson 360.303.7452 Christina.Anderson@terracon.com
☐	☒	John McCaslin 206.795.1338 John.McCaslin@terracon.com
☐	☐	Scott Parker 206.714.7152 Scott.Parker@terracon.com
☐	☐	Joel Whelchel 951-990-0983 Joel.Whelchel@terracon.com
☐	☐	Krista Anderson 972-310-4055 Krista.Anderson@terracon.com
☐	☐	Bryn Honnold 425.293.3901 Bryn.Honnold@terracon.com
☐	☐	Jacob Lindberg 425.697.1027 Jacob.Lindberg@terracon.com
☐	☐	Daniel Sheppard 425.273.6046 Daniel.Sheppard@terracon.com
☐	☐	Lydia Slugen 425.877.7054 Lydia.Slugen@terracon.com

Company: Terracon
Address: 21905 64th Ave W.
Mountlake Terrace, WA 98043
Phone: 425-771-3304

Project Name/Number: 81247645
Project Location: Snoqualmie Valley ECC

- ☐ PCM Air (NIOSH 7400)
- ☐ TEM (NIOSH 7402)
- ☐ TEM (AHERA)
- ☐ TEM (EPA Level II Modified)
- ☒ PLM (EPA 600/R-93-116)
- ☐ EPA 400 Points (600/R-93-116)
- ☐ EPA 1000Points (600/R-93-116)
- ☐ PLM Gravimetry (600/R-93-116)
- ☐ Asbestos in Vermiculite (EPA 600/R-04/004)
- ☐ Asbestos in Sediment (EPA 1900 Points)
- ☐ Asbestos Friable/Non-Friable (EPA 600/R-93/116)
- ☐ Other

Reporting Instructions: Email
☐ Call ( ) - ☐ Fax ( ) - ☑ Email See Above

Total Number of Samples 25

	Sample ID	Description	A/R
1	ECC-01A	GWB w/ Joint Compound - No Texture Locations	
2	-01B	↓ ↓	
3	-01C	↓ ↓	
4	-02A	Pink Fiberglass Insulation w/ Foil+Paper wrap	
5	-02B	↓ ↓	
6	-02C	↓ ↓	
7	-03A	2x4 Suspended Ceiling Tile	
8	-03B	↓	
9	-03C	↓	
10	-04A	White Pliable Sealant	
11	-04B	↓	
12	-04C	↓	
13	-05A	Texture on GWB	
14	-05B	↓	
15	-05C	↓	

	Print Name	Signature	Company	Date	Time
Sampled by	John McCaslin		Terracon	10/16/2024	
Relinquish by	John McCaslin		Terracon	10/17/2024	1140

Office Use Only

	Print Name	Signature	Company	Date	Time
Received by	Kennedy		NVL	10/17/24	1140
Analyzed by					
Called by					
Faxed/Email by					

2418848 2 of 2

NVL LABS INDUSTRIAL HYGIENE SERVICES
Laboratory | Management | Training

ASBESTOS CHAIN OF CUSTODY

- ☐ 1 Hour
- ☐ 2 Hours
- ☐ 4 Hours
- ☐ 24 Hours
- ☐ 3 Days
- ☐ 4 Days
- ☐ 5 Days
- ☒ 10 Days

Please call for TAT less than 24 Hours

PM:	CC:	
☒	☐	Christina Anderson 360.303.7452 Christina.Anderson@terracon.com
☐	☒	John McCaslin 206.795.1338 John.McCaslin@terracon.com
☐	☐	Scott Parker 206.714.7152 Scott.Parker@terracon.com
☐	☐	Joel Whelchel 951-990-0983 Joel.Whelchel@terracon.com
☐	☐	Krista Anderson 972-310-4055 Krista.Anderson@terracon.com
☐	☐	Bryn Honnold 425.293.3901 Bryn.Honnold@terracon.com
☐	☐	Jacob Lindberg 425.697.1027 Jacob.Lindberg@terracon.com
☐	☐	Daniel Sheppard 425.273.6046 Daniel.Sheppard@terracon.com
☐	☐	Lydia Slugen 425.877.7054 Lydia.Slugen@terracon.com

Company: Terracon
Address: 21905 64th Ave W.
Mountlake Terrace, WA 98043
Phone: 425-771-3304

Project Name/Number: 81247645
Project Location: Snoqualmie Valley ECC

- ☐ PCM Air (NIOSH 7400)
- ☐ TEM (NIOSH 7402)
- ☐ TEM (AHERA)
- ☐ TEM (EPA Level II Modified)
- ☒ PLM (EPA 600/R-93-116)
- ☐ EPA 400 Points (600/R-93-116)
- ☐ EPA 1000Points (600/R-93-116)
- ☐ PLM Gravimetry (600/R-93-116)
- ☐ Asbestos in Vermiculite (EPA 600/R-04/004)
- ☐ Asbestos in Sediment (EPA 1900 Points)
- ☐ Asbestos Friable/Non-Friable (EPA 600/R-93/116)
- ☐ Other

Reporting Instructions: Email
☐ Call ( ) - ☐ Fax ( ) - ☑ Email See Above

Total Number of Samples 25

	Sample ID	Description	A/R
1	ECC-06A	GWB w/Joint Compound - Texture Locations	
2	-06B	↓ ↓	
3	-06C	↓ ↓	
4	-07A	Mastic Associated w/4" Vinyl Coveback	
5	-07B	↓	
6	-07C	↓	
7	-08A	FRP w/Mastic	
8	-09A	3-Tab Asphaltic Roofing	
9	-09B	↓	
10	-09C	↓	
11			
12			
13			
14			
15			

	Print Name	Signature	Company	Date	Time
Sampled by	John McCaslin		Terracon	10/16/2024	
Relinquish by	John McCaslin		Terracon	10/17/2024	1140

Office Use Only

	Print Name	Signature	Company	Date	Time
Received by	Kennedy			10/17/24	1140
Analyzed by					
Called by					
Faxed/Email by					

DOCUMENT 00 41 10 – BID SUBMITTAL LIST

PART 1 - CHECKLIST FOR BID SUBMITTAL

1.1 BIDDERS MUST COMPLETE AND SUBMIT THE FOLLOWING DOCUMENTS:

A. **Bid Form** (General Contractors only)Section 00 41 13

B. **Bid Guaranty Bond** (or a certified or cashier's check) Section 00 41 13

Items A, & B shall be submitted in a sealed envelope at scheduled bid date and time. See paragraph 104.D.1 in Section 00 21 13 “Instructions to Bidders”, for full requirements.

C. **List of Subcontractors and Suppliers** (HVAC, Plumbing, Electrical) Section 00 41 13 (Shall be submitted no later than 1 hour following the published bid submittal time)

Item C shall be submitted no later than 1 hour following the published bid submittal time.

The list shall be submitted in a sealed envelope to the same location as was the bid. See paragraph 104.B.1 in Section 00 21 13 “Instructions to Bidders”, for full requirements.

D. **List of Subcontractors and Suppliers** (Structural steel, Rebar) Section 00 41 13 (Shall be submitted no later than 48 hours following the published bid submittal time)

Item D shall be submitted no later than 48 hours following the published bid submittal time.

The list shall be submitted in a sealed envelope to the same location as was the bid. See paragraph 104.B.1 in Section 00 21 13 “Instructions to Bidders”, for full requirements.

E. Other Post Bid information

Within twenty-four (24) hours of the Architect’s request, the apparent low Bidder, and any other Bidders so requested, shall submit the Bidder's Qualification Statement and other information to the to the Architect and the Snoqualmie Valley School District. See paragraph 106.A.1 in Section 00 21 13 “Instructions to Bidders”, for full requirements.

All foregoing documents must be submitted with the Bid, except the two Lists of Subcontractors and Suppliers, which must be turned in within the time following the published bid submittal time as indicated above.

This checklist is provided only as a convenience for Bidders and is not intended to be a detailed or a complete listing of all documents that may be required. Bidders are advised to read carefully all portions of the Contract Documents and to comply with all requirements.

END OF DOCUMENT 00 41 10

To: Snoqualmie Valley School District No. 410
8001 Silva Ave. SE
Snoqualmie, WA 98065

Date: _____

Bid I.D. No.: ECC-2024-01

Name of Project: Early Childhood Center At Two Rivers School

Project Address: 330 Ballarat Ave. N
North Bend, WA, 09045

From:

_____
Name of Business Entity

I / We have received the following bid documents entitled Early Childhood Center At Two Rivers School for Snoqualmie Valley School District as enumerated:

- Project Specification Manual, dated 10/31/2024, prepared by SCR Architects
- Project Drawings dated 10/31/2024, prepared by SCR Architects (Architectural), Jacobson Consulting Engineers (Civil), Atlas Design Group (Structural), Bogard Pasqua Engineers, (Mechanical), and TFWB Engineers (Electrical).

Having carefully examined the Bid Documents and Instructions to Bidders, as well as the site and conditions affecting the Work, and all Addenda, the undersigned Bidder represents that: (1) it has the work force and means to complete the Work; and (2) it will furnish all labor, materials, equipment, and management to perform all Work required by and in strict accordance with the above-named documents for the following sum. Bid amounts shall include overhead, profit, bonds, insurance, and any other expense required to complete the Work. State and Local Sales Tax on the Base Bid is not included.

ADDENDA: Receipt of the following addenda to the Contract Documents is hereby acknowledged. Failure to acknowledge herein receipt of all addenda issued may be considered an irregularity in the Bid.

Addendum No. _____ Addendum No. _____

Addendum No. _____ Addendum No. _____

Addendum No. _____ Addendum No. _____

I / WE SUBMIT THE FOLLOWING BID:

I / We will conduct this project contract, and provide all required materials and labor for its completion, for the lump-sum price of:

BASE BID (state in both figures and words)

Amount: $_____

_____

_____Dollars

which lump sum is hereby designated Base Bid which excludes both sales tax (state and local) and alternate bid costs.

UNIT PRICES

Refer to Section 01 22 00 for complete unit price descriptions. Sums for unit prices shall not include Washington State Sales Tax.

UNIT PRICE 1 – Replacement plywood sheathing as defined in the Specifications.

1. Replacement plywood sheathing – Amount $ _____ / Per one 4'x8' sheet
(For purpose of bidding and award, the price above will be added to bid based on fifty (50) 4'x8' sheets of plywood per 01 22 00 / 3.1 / A.)

TRENCH EXCAVATION SAFETY PROVISIONS

If the contract contains any work which requires trenching exceeding a depth of four feet, all costs for adequate trench safety systems shall be identified as a separate bid item in compliance with Chapter 39.04 RCW. The purpose of this provision is to ensure that the bidder agrees to comply with all the relevant trench safety requirements of Chapter 49.17 RCW. This bid amount shall be considered as part of the **TOTAL BASE BID** set forth above. If trench excavation safety provisions do not pertain to this project, put N.A. for dollar amount. Failure to complete this requirement may be considered as non-responsive to the bid solicitation.

Trench Excavation Safety Provisions Only _____ DOLLARS ($ _____)

IN SUBMITTING THIS BID, I / WE AGREE:

A. BASE BID AND UNIT PRICING — LOW BID ASSESSMENT

To determine the effective low bid established by this Bid Proposal, Owner will assess the bid amount as: Base Bid Amount plus the pricing of above stated units of each unit-pricing contract extension feature, plus any alternate bid amount accepted by the owner. The owner reserves the right to accept or not accept alternate bid prices in its determination of the lowest responsible and responsive bid.

B. CONTRACT AND BONDS

If notified of the acceptance of this bid within thirty (30) days after the time set for opening bids, I/we agree to execute a contract for the above work, for a compensation computed from the above sums, on a standard Form of Agreement provided by the Snoqualmie Valley School District, and to furnish performance and payment bonds as required by the specifications.

C. BID GUARANTEE

I / We further agree the Bid Guarantee check or bid bond accompanying this bid will be left in escrow with the Owner — the amount being a penal sum measure of the liquidated damages which the Owner will sustain by the failure of the undersigned to execute terms of said agreement — and if I / We fail to deliver said documents within ten days after written notice of the award of the contract to him, then the bid bond proceeds will be executed or the check shall become the property of the Owner.

If the undersigned delivers said contract and bonds, or if the Owner fails to accept the bid within thirty (30) days after the time set for opening bids, the bid security check will be returned and the bond shall become void.

Enclosed is a Certified Check, Cashier's Check, or Bid Bond in the amount of 5% or more of the bid amount.

D. CONTRACTOR/SUBCONTRACTOR IDENTIFICATION

Provide identification of all business entities providing contract services per the attached form.

E. REFERENCES

Provide three client project references per the attached form.

F. CONTRACT COMPLETION & LIQUIDATED DAMAGES

Provide labor and material as required to complete the project in the period specified under Item 4 Project Schedule of the Supplemental Special Conditions to the Contract. Should work not be Substantially Complete within the allotted Contract Time, I / We agree to pay as liquidated damage $1000 for each consecutive day thereafter that substantial completion is not achieved.

G. CERTIFICATION

I / We hereby certify, under penalty of perjury, that within a three-year period immediately preceding the date of the bid solicitation, that we have not been determined by a final and binding citation and notice of assessment issued by the Department of Labor and Industries or through a civil judgment entered by a court of limited or general jurisdiction to have willfully violated, as defined in RCW 49.48.082, any provision of Chapter 49.46, 49.48, or 49.42 RCW.

I / We hereby certify that our bid is genuine and have not entered into collusion with any other bidder(s) or any other person(s).

Respectfully submitted, this _____day of _____, 2024

_____
Legal Name of Firm, Partnership, Person or Corporation

_____
State of Corporation or, if not a corporation, the state where the Contractor's business entity was formed

_____
Signature of Person Authorized to Sign (Long Hand)

_____
Print Name of Person Authorized to Sign

_____
Title of Person Authorized to Sign (Official Capacity)

_____
Mailing Address of Bidder City, State, Zip Code

_____
Telephone Number

E-Mail Address

State of Washington Contractor's License No. License Expiration Date

State of Washington Excise Tax Registration No.

Federal I.D. No.

TO BE SUBMITTED WITHIN ONE HOUR OF INITIAL BID

NOTE: This list of Subcontractors and Suppliers must be submitted within 1 hour of the published bid submittal time.

To: Snoqualmie Valley School District No. 410
8001 Silva Ave. SE
Snoqualmie, WA 98065

Date: _____

Bid I.D. No.: ECC-2024-01

Name of Project: Early Childhood Center At Two Rivers School

Project Address: 330 Ballarat Ave. N
North Bend, WA, 09045

The subcontractors we propose to use for the Base Bid are as follows:

1. HVAC _____
2. Plumbing _____
3. Electrical _____

RCW 39.30.060 requires, in part, that on any Bid over $1,000,000.00, the Bidder shall submit within one hour of the published bid submittal time, " the names of the subcontractors with whom the bidder, if awarded the contract, will subcontract for performance of the work of: HVAC (heating, ventilation, and air conditioning); plumbing as described in chapter 18.106 RCW; and electrical as described in chapter 19.28 RCW, or to name itself for the work". The bidder shall not list more than one subcontractor for each category of work identified, unless subcontractors vary with bid alternates, in which case the bidder must indicate which subcontractor will be used for which alternate." Failure to comply with this RCW shall render the Bidder's Bid nonresponsive and, therefore, void.

The Bidder acknowledges that if it is awarded the Contract, it cannot change a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such change. See Subparagraph 5.2.4. of the General Conditions of the Contract for Construction, Section 00 71 00.

_____ _____
Signature Contractor's Name

TO BE SUBMITTED WITHIN FORTY EIGHT HOURS OF INITIAL BID

NOTE: This list of Subcontractors and Suppliers must be submitted within 48 hours of the published bid submittal time.

To: Snoqualmie Valley School District No. 410
8001 Silva Ave. SE
Snoqualmie, WA 98065

Date: _____

Bid I.D. No.: ECC-2024-01

Name of Project: Early Childhood Center At Two Rivers School

Project Address: 330 Ballarat Ave. N
North Bend, WA, 09045

The subcontractors we propose to use for the Base Bid are as follows:

4. Structural Steel Installation _____

5. Rebar Installation _____

RCW 39.30.060 requires, in part, that on any Bid over $1,000,000.00, the Bidder shall submit within 48 hours after the published bid submittal time, "the names of the subcontractors with whom the bidder, if awarded the contract, will subcontract for performance of the work of structural steel installation and rebar installation.". The bidder shall not list more than one subcontractor for each category of work identified, unless subcontractors vary with bid alternates, in which case the bidder must indicate which subcontractor will be used for which alternate." Failure to comply with this RCW shall render the Bidder's Bid nonresponsive and, therefore, void.

The Bidder acknowledges that if it is awarded the Contract, it cannot change a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such change. See Subparagraph 5.2.4. of the General Conditions of the Contract for Construction, Section 00 71 00.

_____ _____
Signature Contractor's Name

END OF SECTION 00 41 13

1.01 BIDDER'S QUALIFICATION STATEMENT: The apparent low Bidder shall deliver this fully filled out and completed form to the Owner per Section 00 21 13 "Instructions to Bidders", paragraph 106.A.

To: Snoqualmie Valley School District
8001 Silva Ave. SE
Snoqualmie, WA 98065

Date: _____

Bid I.D. No.: ECC-2024-01

From: _____

_____

_____

To assist in consideration of its Bid for the Project, the Bidder hereby certifies under oath that the information provided below is true and complete.

1. Structure of Bidder

a. The Bidder has been in business as a Bidder for _____ years.

b. The Bidder has been in business under its present business name for _____ years.

c. The Bidder has operated under the following other names:

_____

_____

d. If the Bidder is (check appropriate box and fill out associated information)

□ A corporation, state:

State of incorporation: _____

Date of incorporation: _____

President's name: _____

Other officer's name(s): _____

_____

□ A partnership, please state:

Date of organization: _____

Type of partnership (if applicable): _____

_____

Name(s) of general partner(s): _____

_____

□ Individually owned, please state:

Date of organization: _____

Name of owner: _____

□ A joint venture, please state:

Names of joint venturers: _____

_____

Date of joint venture agrmnt: _____

e. The Bidder has been registered as a Bidder for in the State of Washington for ___ _____ years.

2. Licenses

a. Please list the Bidder's registration or license numbers, states and trade categories:

Number	State	Trade Category

3. Experience

a. Please list the types of work the Bidder normally performs with its own forces.

b. Please state the types of work the Bidder will perform with its own forces on the Project and the approximate percentage of the Contract Sum (Base Bid) that this work represents.

c. Please list the construction projects the Bidder has in progress. Please include the name of each project, the owner, architect, location, contract amount, percent complete and scheduled completion date.

d. Please list the major projects the Bidder has completed in the past five years. Please include the name of project, location, the owner, architect, contract amount, date of completion and percentage of the cost of the work performed with Bidder's own forces.

e. What is the average annual gross revenue of construction work the Bidder performed during the past five years?

f. Please list the construction experience and present commitments of the individuals who will be involved in managing or supervising the Project.

4. Disputes (If the answer to any of the questions below is yes, please attach details.)

a. Has the Bidder ever failed to complete any project?

□ yes □ no

b. Are there any judgments, claims, arbitration proceedings or litigation pending or outstanding against the Bidder or its officers?

□ yes □ no

c. Has the Bidder been a party to any litigation or arbitration relating to construction projects within the last five years?

□ yes □ no

d. Has the Bidder been subject to action by any state or federal agency, such as WISHA, OSHA, or Labor & Industries?

□ yes □ no

e. Within the last five years, has any officer or principal of the Bidder been an officer or principal of another entity when it failed to complete a construction contract?

□ yes □ no

5. References

a. Bank References:

b. Surety:

6. Contractor References

PROJECT REFERENCE 1

Client Name _____

Project Location _____

Contract Date _____

Type of Work _____

_____

Client Contact _____ Telephone No. _____

PROJECT REFERENCE 2

Client Name _____

Project Location _____

Contract Date _____

Type of Work _____

_____

Client Contact _____ Telephone No. _____

PROJECT REFERENCE 3

Client Name _____

Project Location _____

Contract Date _____

Type of Work _____

_____

Client Contact _____ Telephone No. _____

7. Financial Condition – If specifically requested by Owner:

a. Please attach a current financial statement, preferably audited, including the Bidder's latest balance sheet and income statement showing the following:

i. Current Assets (e.g., cash, joint venture accounts, accounts receivable, notes receivable, accrued income, deposits, materials inventory and prepaid expenses);

ii. Net Fixed Assets;

iii. Other Assets;

iv. Current Liabilities (e.g., accounts payable, notes payable, accrued expenses, provision for income taxes, advances, accrued salaries and accrued payroll taxes);

v. Other Liabilities (e.g., capital, capital stock, authorized and outstanding shares par values, earned surplus and retained earnings).

b. Name and address of the firm that prepared the financial statement:

c. The date of the financial statement is:

d. If the financial statement is for an organization other than the Bidder, please explain:

BIDDER

By: _____

Its: _____

STATE OF WASHINGTON)

) ss.

COUNTY OF_____)

On this _____ day of _____, _____, before me, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____ _____, to me known to be the individual who executed the within and foregoing instrument, and acknowledged that he/she signed the same as his/her free and voluntary act and deed, for the uses and purposes therein mentioned.

GIVEN UNDER my hand and official seal hereto affixed the day and year in this certificate first above written.

_____
(Signature of Notary)

_____
(Print or stamp name of Notary)

NOTARY PUBLIC in and for the State

of _____, residing at _____

My Appointment Expires: _____

--- END OF SECTION 00 42 00 ---

DOCUMENT 00 52 00 - AGREEMENT FORM

PART 1 - GENERAL

1.1 USE OF DOCUMENTS

A. Contract Documents are enumerated in Section 00 00 03, “Table of Contents” and Section 00 01 15, “List of Drawing Sheets”.

1.2 RELATED DOCUMENTS

A. Division 00 and Division 01 apply to the work specified in this Section

1.3 DESCRIPTION

A. This Section Provides:

1. Form of Owner and Contractor Agreement
2. Form of Payment Bonds

B. Related Requirements Specified Elsewhere:

1. Section 00 21 13 Instructions to Bidders
2. Section 00 70 00 Conditions of the Contract

1.4 INCORPORATION OF DOCUMENTS

A. The Bidder and Contractor agree to the provisions of the documents named under this Section and agree to consider such named documents a part of the Project Specification.

PART 2 - STANDARD FORM OF AGREEMENT

2.1 A.I.A. Document A101 Standard Form of Agreement Between Owner & Contractor, following this page, where the basis for payment is Stipulated Sum, 2017 Edition — as revised, modified and supplemented, is incorporated as a part of the contract documents as if bound herein.

END OF DOCUMENT 00 52 00

AIA® Document A101® – 2017

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

AGREEMENT made as of the ____day of _____in the year Two Thousand Twenty-Four
(In words, indicate day, month and year.)

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

Snoqualmie Valley School District No. 410
8001 Silva Avenue SE; P.O. Box 400
Snoqualmie Valley, Washington 98065

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

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

Early Childhood Center at Two Rivers School
330 Ballarat Avenue N.
North Bend, Washington 98045

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

SCR Architects
1221 East Pike Street, Suite 205
Seattle, Washington 98122

The Owner and Contractor agree as follows.

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

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

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TABLE OF ARTICLES

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~~EXHIBIT A INSURANCE AND BONDS~~

ARTICLE 1 THE CONTRACT DOCUMENTS

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

ARTICLE 2 THE WORK OF THIS CONTRACT

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

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:
(Check one of the following boxes.)

[ ] ~~The date of this Agreement.~~

[~~X~~] A date set forth in a notice to proceed issued by the Owner.

[~~]~~ ~~Established as follows:~~
(Insert a date or a means to determine the date of commencement of the Work.)

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

§ 3.2 The Contract Time shall be measured from the date of commencement of the ~~Work.~~Work as provided in the notice to proceed.

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:
(Check one of the following boxes and complete the necessary information.)

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

[ ] ~~By the following date:~~ [X] By the following date: July 11, 2025.

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

Portion of Work	Substantial Completion Date
N/A	

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

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be _____ Dollars ($), plus Washington State and local sales tax on the Contract Sum, subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

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

Item	Price

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

Item	Price	Conditions for Acceptance
As allowed under the bidding documents or Contract Documents		

§ 4.3 Allowances, if any, included in the Contract ~~Sum:~~Sum; these descriptions are summary in nature, and the scope of this work is further described in the Contract Documents:
(Identify each allowance.)

Item	Price

§ 4.4 Unit prices, if ~~any:~~any; these descriptions are summary in nature, and the scope of this work is further described in the Contract Documents:
(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)

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

Any delay to this Project could have substantial impact upon and cause significant damages to the Owner. The Owner will assess, and the Contractor will be responsible for, liquidated damages in the amount of $1,000 per day for each calendar day beyond the Contract Time that Substantial Completion is not timely achieved.

The Contractor and Owner agree that this liquidated damages amount is not a penalty but is a reasonable estimation of actual damages to the Owner, as of this date of Agreement, based on the inherent uncertainty and difficulty in calculating and quantifying damages caused by delays in the construction of school district facilities.

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

N/A

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

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

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

See the Contract Documents.

§ 5.1.3 ~~Provided that an Application for Payment is received by the Architect not later than the day of a month, the~~ The Owner shall make payment of the amount certified to the Contractor ~~not later than the day of the month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than ( ) days after the Architect receives the Application for Payment.~~ as provided in the Contract Documents.
(Federal, state or local laws may require payment within a certain period of time.)

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

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

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

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

.1 That portion of the Contract Sum properly allocable to completed Work;

.2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in writing and in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and

.3 That portion of Construction Change Directives that the Architect ~~determines,~~ determines and the Owner agrees, in the Architect's professional judgment, to be reasonably justified.

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

.1 The aggregate of any amounts previously paid by the Owner;

.2 The amount, if any, for Work that remains uncorrected and for which the Owner or Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;

.3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;

.4 For Work performed or defects discovered since the last payment application, any amount for which the Owner or Architect may withhold payment, or for which the Owner or Architect may nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and

.5 Retainage withheld pursuant to Section 5.1.7.

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§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:
(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

Statutory retainage of five percent (5%) shall be withheld from all payments, unless the Contractor submits and the Owner accepts a retainage bond pursuant to RCW 60.28.011(6).

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

N/A

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

Per statute and the Contract Documents.

§ 5.1.7.3 ~~Except as set forth in this Section 5.1.7.3, upon~~ Upon obtaining Substantial Completion of the Work, the Contractor may submit an Application for Payment ~~that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7.~~ sufficient to increase the total payments to ninety-eight percent (98%) of the Contract Sum (see Section 9.2.5 of the A201 regarding the final two percent (2%) of the Contract Sum to be paid after Substantial Completion), less such amounts as the Architect shall determine for incomplete Work in excess of the amount allocated under Section 9.2.5 of the A201 and any other amounts as specified in the Contract Documents. The Application for Payment submitted at Substantial Completion shall not include ~~retainage as follows:~~a request for payment of retainage.
(Insert any other conditions for release of retainage upon Substantial Completion.)

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

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

§ 5.2 Final Payment

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

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

.2 a final Certificate for Payment has been issued ~~by the Architect.~~by the Architect; and

.3 Final Acceptance by the Owner's Board of Directors has occurred.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than ~~30 days after the issuance of the Architect's final Certificate for Payment, or as follows:~~sixty days after completion of all requirements for Final Acceptance listed in the A201-2017 General Conditions.

§ 5.2.3 Retainage shall be paid according to statute and the Contract Documents.

§ 5.3 Interest

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

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% Payments due and unpaid under the Contract Documents shall bear interest at the Bank of America prime plus two percent per annum, unless a different rate is required by RCW 39.76.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

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

There is no "Initial Decision Maker" for this Project.

§ 6.2 Binding Dispute Resolution

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

[ ] Arbitration pursuant to Section 15.4 of AIA Document A201–2017

[ ] Litigation in a court of competent jurisdiction

[ ] Other *(Specify)*

[X] Litigation in Superior Court in King County, Washington

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

ARTICLE 7 TERMINATION OR SUSPENSION

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

§ 7.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A201–2017, then the Owner shall pay the Contractor a termination fee as follows:
(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)

N/A

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

ARTICLE 8 MISCELLANEOUS PROVISIONS

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

§ 8.2 The Owner's Designated representative:
(Name, address, email address, and other information)

Ryan Stokes
Assistant Superintendent (CFO and COO)
Snoqualmie Valley School District No. 410
8001 Silva Avenue SE; P.O. Box 400
Snoqualmie Valley, Washington 98065
stokesr@svsd410.org

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All communications shall be directed to the Project Manager at the address below, except for notices required by this Agreement, which shall be directed to the Designated Representative above and copied to the Project Manager below.

Brandon L Klepper
Director of Operations
Snoqualmie Valley School District No. 410
8001 Silva Avenue SE; P.O. Box 400
Snoqualmie Valley, Washington 98065
(425) 831-8005
klepperb@svsd410.org

§ 8.3 The Contractor's Designated representative:
(Name, address, email address, and other information)

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

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in the A201 General Conditions and as described elsewhere in the Contract Documents. AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, ~~and elsewhere in~~ is not used and is not a part of the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in ~~AIA Document A101™–2017 Exhibit A,~~ the A201 General Conditions and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic ~~format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with a building information modeling exhibit, if completed, or as otherwise~~ format may be given as set forth below:
(If other than in accordance with ~~a building information modeling exhibit,~~ AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

Per the Contract Documents.

§ 8.7 Other provisions:

N/A

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- **.1** AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor
- **.2** ~~AIA Document A101™–2017, Exhibit A, Insurance and Bonds~~ [Not used.]
- **.3** AIA Document A201™–2017, General Conditions of the Contract for Construction as revised by the Owner. All references to the A201 or to the General Conditions are to the revised document.
- **.4** ~~Building information modeling exhibit, dated as indicated below:~~[Not used.]
  (Insert the date of the ~~building information modeling exhibit~~ E203-2013 incorporated into this Agreement.)

  N/A

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.5 Drawings

Number	Title	Date
See the Index of Drawings in the Project Manual		

.6 Specifications

Section	Title	Date	Pages
See the Table of Specifications in the Project Manual			

.7 Addenda, if any:

Number	Date	Pages

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

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

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

_____

~~[ ]~~ ~~The Sustainability Plan:~~**X** [ ] Supplementary and other Conditions of the Contract:

~~Title~~	~~Date~~	~~Pages~~

Document	**Title**	**Date**	**Pages**
See the Project Manual dated _____, 2024			

~~[ ]~~ ~~Supplementary and other Conditions of the Contract:~~

~~Document~~	~~Title~~	~~Date~~	~~Pages~~

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

Department of Labor and Industries Prevailing Wage Rates.

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

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
(Printed name and title)	*(Printed name and title)*

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Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, , hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 09:52:50 PT on 10/11/2024 under Order No. 3104238397 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A101™ – 2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum,other than changes shown in the attached final document by underscoring added text and striking over deleted text.

_____

(Signed)

_____

(Title)

_____

(Dated)

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SECTION 00 55 00 – CONDITIONAL NOTICE TO PROCEED

Following Bid Award by the Snoqualmie School District Board of Directors, Facility Construction will issue a Conditional Notice to Proceed Letter.

Work onsite can commence once the Contractor has provided the District with the required bonds and insurance to allow the contract to be signed.

END OF SECTION 00 55 00

SECTION 00 62 10 - CERTIFICATE OF COMPLIANCE

No final payment shall be made until the Contractor shall file with the Owner, prior to acceptance of the Work, a notarized Certification of Compliance in the following form:

The Contractor does hereby certify that all work has been performed and materials supplied in accordance with the drawings, specifications and Contract Documents for the above Work, and that:

No less than the prevailing rates of wages as ascertained by the governing body of the Contracting agency has been paid to laborers, workmen and mechanics employed on this Work;

There have been no unauthorized substitutes of Subcontractors; nor have any subcontractors been entered into without the names of the Subcontractors having been submitted to the Owner prior to the start of such subcontracted work;

No subcontract was assigned or transferred or performed by any Subcontractor other than the original Subcontractor, without prior notice having been submitted to the Owner together with the names of all Subcontractors;

All claims for material and labor and other service performed in connection with these specifications have been paid;

All monies due the State Industrial Accident Fund, the State Unemployment Compensation Trust Fund, the State Tax Commission, and/or others have been paid.

In WITNESS WHEREOF, the undersigned has signed and sealed this instrument

this _____ day of _____ , 20_____.

Firm Name _____

Signature _____

Title _____

(Attest) _____

(SEAL IF BIDDER IS A CORPORATION)

As determined necessary, evidence of compliance may be required to be submitted with and made a part of this Certificate of Compliance.

END OF SECTION 00 62 10

SECTION 00 62 50 – EQUAL OPPORTUNITY

EQUAL OPPORTUNITY

During the performance of this Contract, the Contractor shall comply fully with all applicable laws prohibiting discrimination, including RCW Chapter 49.60.

END OF SECTION 00 62 50

SECTION 00 70 00 - CONDITIONS OF THE CONTRACT

PART 1 - GENERAL

1.1 Use of Documents

A. Contract Documents are enumerated in Sections 00 00 03 Table of Contents and 00 01 15 List of Drawing Sheets.

B. Refer to Section 01 10 00 Document Integrated Format and Definitions.

1.2 Description

A. Contract Conditions described in this Section:

1. General Conditions
2. Special Conditions
3. Supplemental Special Conditions

B. Related Requirements specified elsewhere:

1. Division 00 PROCUREMENT AND CONTRACTING REQUIREMENTS
2. Division 01 GENERAL REQUIREMENTS

1.3 Reference to Articles

A. References to an Article of this Section is a reference to Articles of the General Conditions and Special Conditions of the Contract for Construction as specified hereafter.

PART 2 - GENERAL CONDITIONS OF THE CONTRACT

AIA Document A201 - 2007, "General Conditions of the Contract for Construction" as revised, modified and supplemented is incorporated as a part of the contract documents as if bound herein.

PART 3 - SPECIAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

See Section 00 71 00 hereafter.

PART 4 - SUPPLEMENTAL SPECIAL CONDITIONS OF THE CONTRACT

See Section 00 72 00 hereafter.

PART 5 - PUBLIC WORKS CONDITIONS

See Section 00 73 00 hereafter.

END OF SECTION 00 70 00

AIA® Document A201® – 2017

General Conditions of the Contract for Construction

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

Early Childhood Center at Two Rivers School
330 Ballarat Avenue N.; North Bend, Washington 98045

THE OWNER:
(Name, legal status and address)

Snoqualmie Valley School District No. 410
8001 Silva Avenue SE; P.O. Box 400; Snoqualmie Valley, Washington 98065

THE ARCHITECT:
(Name, legal status and address)

SCR Architects
1221 East Pike Street, Suite 205; Seattle, Washington 98122

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

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

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Owner or Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include other documents such as the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal requirements. In the event of a conflict or discrepancy among or in the Contract Documents that cannot be resolved by interpreting the Contract Documents as a single, integrated document and giving effect to each provision therein, interpretation shall be governed in the following priority, with an Addendum or a revision to a Contract Document having precedence over the original document and later Addenda having precedence over earlier:

.1 Agreement (revised A101-2017), (written amendments having precedence)
.2 Any Special Conditions
.3 Any Supplementary Conditions
.4 These revised General Conditions (A201-2017)
.5 Specifications
.6 Material and systems schedules
.7 Drawings (large-scale having precedence over small-scale, and written or computed dimensions having precedence over scaled dimensions)

In the event that work is shown on Drawings but not contained in Specifications or Schedules, the work as shown shall be provided at no change in the Contract Sum or Contract Time, according to specifications consistent with and reasonably inferable from the Work shown on the Drawings issued by the Architect.

§ 1.1.2 The Contract

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

§ 1.1.3 The Work

The term "Work" means the administrative procedures, construction and services required by the Contract Documents, whether completed or partially completed, and whether new construction or modification of existing structures, and includes all other demolition, abatement, disposal, labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project. Where the Work requires construction that modifies or interfaces with existing structures, the Contractor shall take such actions as are necessary to make its Work compatible with and appropriately interface with the as-built conditions of the existing structures.

§ 1.1.4 The Project

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

§ 1.1.5 The Drawings

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

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§ 1.1.6 The Specifications

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

§ 1.1.7 Instruments of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, the Project Manual, studies, surveys, models, sketches, drawings, specifications, and other similar ~~materials.~~materials through which the Work to be executed by the Contractor is described..

§ 1.1.8 Initial Decision Maker

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

§ 1.1.9 PROJECT MANUAL

The Project Manual is a volume or volumes assembled for the Work which may include the bidding requirements, sample forms, Conditions of the Contract, Specifications, and other related materials such as construction details and schedules.

§ 1.2 Correlation and Intent of the Contract Documents

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

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

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any ~~trade.~~trade, nor shall it remove the Contractor's obligation to complete all of the Work when coordination between the Specifications and the Drawings or coordination between subcontracts is required.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words not defined in the Contract Documents that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.2.4 If the Contractor discovers that the Specifications, Drawings, or Project Manual fail to particularly describe the material or kind of goods to be used in any place or discovers an inconsistency or ambiguity between the Specifications, Drawings, or Project Manual with regard to the material or kind of goods, or an inconsistency or ambiguity arises internally within the Specifications, Drawings, or Project Manual with regarding to the material or kind of goods, then the Contractor shall make inquiry of the Architect as to what is intended and best suited. The material or kind of goods that a competent contractor would use in its place to produce first quality finished Work shall be considered a part of the Contract without adjustment to the Contract Sum or Contract Time.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered ~~articles, or~~ articles and identified references to Sections in this document, (3) the titles of other documents published by the American Institute of ~~Architects.~~Architects, or (4) published codes and standards.

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§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement. Reference in the singular to an article, device, item or piece of equipment shall include the larger of the number of such articles indicated in the Contract Documents or the number required to complete the installation. Specification and Drawing notes may include incomplete sentences where words such as "shall," "shall be," "the Contractor shall," and similar phrases shall be supplied by inference. The term(s) "approved," "or approved" and "as approved" mean approved by the Architect, and by any governing codes and officials, and by any quality standards specified as applicable to the work in question. "As directed" means as directed by the Architect or the Owner's Authorized Representative. The term "provide" means to furnish and install. The term "as required" or "as necessary" means as required by applicable codes or standards, and/or as may be required for proper completion of the work. Divisions and Sections included are listed in the "Table of Contents," together with the number of pages in each Section. The Contractor shall check its copies of the Specifications with the "Table of Contents" to ensure that they are complete.

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

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

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the ~~Work.~~ Work under the Contract Documents and with respect to the Project. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. All copies of the Instruments of Service, except the Contractor's record set, shall be returned or suitably accounted for to the Architect, on request, upon completion of the Work. The Contractor may retain one record set. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

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

§ 1.6.2 Notice of Claims and Claims as provided in ~~Section 15.1.3~~ Article 15 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by electronic transmission, by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

~~The parties shall agree upon written protocols governing the transmission and use of, and reliance on, Instruments of Service~~ Contractor acknowledges that drawings, specifications, Instruments of Service, or any other information or documentation ~~in digital form.~~that Contractor receives in digital form may contain transmission or translation errors and are issued for convenience only, and thus Contractor may only rely upon hard copy documents. Any electronic files other than PDF files will be provided for the convenience of the Contractor. Neither the Architect nor the Owner shall be liable for any inaccuracy or incompleteness in information contained in an electronic copy other than PDF files of an Instrument of Service. Electronic files other than PDF files are not Contract Documents and cannot be relied upon as identical to the Contract Documents. Use of information contained in electronic files other than PDF files is at the Contractor's risk and without liability to the Architect or the Owner. The Contractor is required to execute the Architect's electronic document release to obtain the Instruments of Service other than hard copy and pdf files.

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§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to ~~written~~ protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in an agreement required by the Owner or Architect, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the ~~Owner or the Owner's authorized representative.~~School District Board of Directors or the Owner's Designated Representative. The "Owner" does not include teachers, district administrators, the school principal, staff, custodians, maintenance or safety workers, other School District employees or consultants, or others at the school. WAIVERS OF PROVISIONS OF THIS CONTRACT CAN ONLY BE MADE IN WRITING AND BY THE OWNER'S BOARD OF DIRECTORS. No other person is authorized to grant such waivers on behalf of the Owner. No officer, agent, representative, or employee of the Owner shall be personally responsible for any liability arising under this Agreement.

§ 2.1.2 ~~The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.~~[Not used.]

§ 2.2 Evidence of the Owner's Financial Arrangements

§ 2.2.1 ~~Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.~~[Not used.]

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

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

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

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§ 2.3 Information and Services Required of the Owner

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

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing engineering or architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Architect" means the Architect or the Architect's authorized representative and does not include any employees of the Owner.

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

§ 2.3.4 The Owner ~~shall~~ may furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work. The Contractor should assume that the locations of any underground or hidden utilities, active or abandoned underground tanks, plumbing or electrical runs indicated in the surveys or Contract Documents are shown in approximate locations, but the Contractor is responsible for making all utility location checks and verifications. The Contractor is responsible for performing all utilities investigation and location work to determine the precise locations thereof. The Contractor shall not damage or interrupt utilities or utilities services of any kind. The Contractor shall bear the risk of loss arising out of its Work which directly or indirectly damages or interrupts any utilities or utilities services, or causes or contributes to damages of any nature, except in the case where the loss resulted because the utility location information provided by Owner or Utility Provider was significantly inaccurate.

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

§ 2.3.6 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor ~~one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.~~free of charge any copies of the Contract Documents as are returned by bidders or as otherwise specified in the Contract Documents. Additional copies may be obtained at the cost of reproduction. Electronic files may be available from the Architect and may be subject to its terms.

§ 2.4 Owner's Right to Stop the Work

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

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue to make reasonable progress toward the correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. In the event such deficiencies threaten the health or safety of the Owner's employees, students or occupants, or exist within fourteen calendar days of the date on which the Owner is scheduled to begin to operate school at the Project, the Owner may immediately proceed to correct such deficiencies without notice and without the ten-day cure period. Such action by the Owner and amounts charged to the Contractor ~~are both subject to prior approval of the Architect and the Architect may,~~ shall

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entitle the Owner and the Architect to, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services and expenses made necessary by such default, neglect, or failure. The right of the Owner to correct the Work pursuant to this Section 2.4 shall not give rise to any duty on the part of the Owner to exercise this right for the benefit of itself or others. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15. The Owner's exercise of its rights under this Section shall not adversely affect any warranties applicable to the Project.

ARTICLE 3 CONTRACTOR

§ 3.1 General

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

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract ~~Documents.~~Documents and submittals approved or accepted pursuant to Section 3.12.

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

§ 3.1.4 The Contractor shall be and operate as an independent contractor in the performance of the Work and shall have complete control over and responsibility for all personnel performing the Work. The Contractor is not authorized to enter into any agreements or undertakings for or on behalf of the Owner or to act as or be an agent or employee of the Owner.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents. By executing this Contract, the Contractor represents and acknowledges that the Contract Sum is reasonable compensation for all the Work, that the Contract Time is adequate for the performance of the Work, and that it has carefully examined the Contract Documents and the Project site, including any existing structures and access thereto, and any drawings of the existing conditions available from the Owner, and that it has satisfied itself as to the nature, location, character, quality and quantity of the Work, the labor, materials, equipment, goods, products, supplies, work, services and other items to be furnished and all other requirements of the Contract Documents, as well as the surface conditions and other foreseeable matters that may be encountered at the Project site or affect performance of the Work or the cost or difficulty thereof, including but not limited to those conditions and matters affecting: transportation, access, local regulations, disposal, handling and storage of materials, equipment and other items; availability and quality of labor, water, electric power, utilities, drainage; availability and condition of roads; normal climatic conditions and seasons; physical conditions at the Project site and the surrounding locality; topography and ground surface conditions; and equipment and facilities needed preliminary to and at all times during the performance of the Work. The failure of the Contractor to fully acquaint itself with any such condition or matter shall not in any way relieve the Contractor from the responsibility for performing the Work in accordance with the Contract Documents and within the Contract Time and the Contract Sum and shall not be the basis of a Claim.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Drawings, Specifications, and other Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of and verify any existing conditions related to that portion of the Work, including all general reference points and any interfering existing conditions, and shall observe any conditions at the site affecting ~~it.~~ it and shall carefully compare and verify such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing such activities. These obligations are for the purpose of facilitating

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coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect and the Owner any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Owner or Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

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

.1 Building Code (with Washington State amendments);
.2 Plumbing Code;
.3 Mechanical Code;
.4 Fire Code;
.5 Electrical Code;
.6 Washington State Energy Code;
.7 Washington State Rules and Regulations for Barrier-Free Design;
.8 Americans with Disabilities Act (ADA);
.9 Federal and State Safety Codes as adapted and/or modified by State and Local Ordinances;
.10 Any applicable municipal code.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of any design errors or omissions or inconsistencies noted by the Contractor, or clarifications or instructions the Owner or Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit notice and Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public ~~authorities.~~authorities unless the Contractor recognized or reasonably should have recognized such error, inconsistency, omission or difference and failed to report it to the Owner and the Architect. If the Contractor performs any construction activity it knows or reasonably should have known involves an error, inconsistency or omission in the Contract Documents or reports referenced therein without such notice to the Owner and the Architect, the Contractor shall be responsible for such performance and shall bear the attributable costs for correction.

§ 3.2.5 Any investigations of hidden or subsurface conditions have been made for design purposes. The results of these investigations may be bound into the Project Manual or otherwise available for the convenience of the Contractor and its Subcontractors of any tier but are not a part of the Contract Documents unless specifically so indicated. While the Contractor may reasonably rely upon such investigation results, there is no guarantee, express or implied, that the conditions indicated are representative of those existing throughout the site or that unforeseen developments may not occur. The Contractor is solely responsible for reasonably interpreting the information and extrapolating beyond the testing location, including each individual boring, test pit or other location.

§ 3.2.6 The Contractor shall do no Work, except Work related to means and methods and temporary controls, without applicable Drawings, Specifications, or written modifications or, where required, Shop Drawings, Product Data, or Samples, unless instructed to do so in writing by the Owner.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, assembly details, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, assembly details,

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sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall ~~be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner and Architect, and shall propose alternative~~ advise the Owner and Architect (a) if the specified instruction or procedure deviates from what the Contractor considers to be good construction practice or jeopardizes jobsite safety, (b) if following the instruction or procedure will negatively affect any warranties, or (c) if the Contractor objects to the instruction or procedure. The Contractor shall propose alternative instructions or procedures acceptable to the Contractor, for which no increase in the Contract Sum or Contract Time will be made. The Contractor shall not proceed with such alternative instruction or procedure without the written acceptance of the Owner and the Architect, and the Contractor shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative ~~solely~~ for conformance with the design intent for the completed construction. ~~Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.~~

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

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work. Under no condition shall a section of Work proceed prior to preparatory Work having been completed, cured, dried and otherwise made satisfactory to receive the related Work. Responsibility for timely installation of all materials and equipment rests solely with the Contractor, who shall maintain coordination control at all times. The Contractor shall require its Subcontractors of any tier to be familiar with all aspects of the Contract Documents related to their Work. The Contractor shall ensure that the responsible Subcontractor has carefully examined all preparatory Work that has been executed to receive its Work and has notified the Contractor (who shall notify the Owner and Architect in writing) of any defects or imperfections in preparatory Work that will, in any way, affect satisfactory completion of the Work. The lack of such notification or the failure of the Contractor to inspect such portions of the Work shall constitute an acceptance of preparatory Work and a waiver of any later claim of defect therein.

§ 3.3.4 The Contractor shall perform such detailed examination, inspection and quality control and surveillance of the Work as will ensure that the Work is progressing and is being completed in strict accordance with the Contract Documents, including the then current issue of the Drawings, Specifications, and accepted shop drawings. The Contractor shall be responsible for examination, inspection and quality control and surveillance of all Work performed by any Subcontractor of any tier. The Contractor shall determine when it is necessary to perform, and shall perform, tests in addition to those requested by the Owner or required by the Specifications or any other provision of the Contract Documents) to verify its inspections or to ensure that the Work is being completed in strict accordance with the Contract Documents. The Contractor shall report known errors, omissions, or inconsistencies to the Architect and the Owner before commencing Work. Inspections by or on behalf of the Owner shall not constitute approval of the Work.

§ 3.3.5 The Contractor shall plan and lay out all Work in advance of installation so as to coordinate all Work without delay or revision. The Contractor is responsible for coordination of all the Drawings related to specific locations. The Contractor shall establish and maintain existing lot lines, restrictions, existing survey markers of any kind, and benchmarks. The Contractor shall establish and maintain all other lines, levels and benchmarks necessary for the execution of the Work and take necessary steps to prevent their dislocation or destruction. The Contractor shall employ a professional land surveyor registered in the State of Washington to initially lay out and be responsible for the accuracy of the Work and to create and submit to the Owner an as-built survey and accurate utility as-builts for use by the Owner. The Contractor shall provide an as-built surveyed site plan noting all site improvements, including but not limited to building corners, storm, sewer, drains, grade and invert elevations, edge of pavement, signs, markings, back of curb, and sidewalks.

§ 3.3.6 The Contractor shall maintain and contemporaneously provide the Owner with copies of daily reports of the activities related to the Work, including but not limited to numbers of workers by trade, equipment in use and stored, inspections, and performance of Change Order and Construction Change Directive Work. The daily report shall be completed on the form included in the Contract Documents or on a form provided by the Contractor and acceptable to

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the Owner. The Contractor shall submit a daily report to the Owner and the Architect on a weekly basis. Payment for any Changes in the Work shall not exceed the labor and equipment indicated on the daily reports.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. Unless stated otherwise in the Contract Documents, to the extent that the Owner allows the Contractor to utilize the Owner's utilities, the Contractor shall install temporary meters to quantify the Contractor's required reimbursement to the Owner for those utilities.

§ 3.4.2 ~~Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the~~ After the Contract has been executed, the Owner and the Architect may consider a written request for the substitution of material or products in place of those specified in the Contract Documents only as described in the Specifications and following the procedures of the Contract Documents. The written request must include the specifications for the material or product and any proposed change in the Contract Sum or Contract Time. The Contractor may make substitutions only with the explicit written consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive. By requesting a substitution, the Contractor represents that it has personally investigated the proposed material or product and determined that it is equal or better in all respects to that specified (or if not equal or better in all respects, the Contractor shall identify such deficiencies), that the same or better warranty will be provided for the substitution, that complete cost data, including all direct and indirect costs of any kind, has been presented, that it waives any other known or unknown Claim for an increase in the Contract Sum or Contract Time related to the substitution, that it has coordinated with affected Subcontractors, that the substitution will not impact other parts of the Work, and that the Contractor will coordinate the installation of the substitute if accepted and make all associated changes in the Work. Neither the Owner nor the Architect will be responsible for the performance of the substituted product.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the ~~Work.~~ Work, including observance of badging, drug testing and all smoking, tobacco, drug, alcohol, parking, safety, weapons, background checks, sexual harassment, and other rules governing the conduct of personnel at the Owner's property and at the Project site. Upon the Owner's request and for any employee working on the Project, the Contractor shall provide the Owner with background checks on each of its employees and of the employees of all Subcontractors of any tier. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them. The Contractor shall ensure that all persons performing the Work comply with the Owner's tobacco-free policy, chemical use and weapons prohibition policies, and will not and do not engage in inappropriate conduct or inappropriate contact with students or staff. Neither the Contractor nor any of its Subcontractors of any tier shall utilize any employee at the site or permit any contact between children at the Owner's public schools and any employee who is a registered sex offender or who has pled guilty to or been convicted of any felony crime involving the physical neglect of a child under Chapter 9A.42 RCW, the physical injury or death of a child under Chapter 9A.32 RCW or Chapter 9A.36 RCW (except motor vehicle violations under Chapter 46.61 RCW), sexual exploitation of a child under Chapter 9A.68A RCW, sexual offenses under Chapter 9A.44 RCW where a minor is a victim, promoting prostitution of a minor under Chapter 9A.88 RCW, the sale or purchase of a minor child under Chapter 9A.64.030 RCW, or violation of similar laws of another jurisdiction. The Contractor shall remove from the Work and Work site any employee or other person who has engaged in such actions or who the Owner reasonably considers objectionable without change in the Contract Sum or Contract Time. Without limiting the generality of the foregoing, the Contractor shall ensure by appropriate provisions in each subcontract agreement that the Contractor may remove from the Work and Work site any Subcontractor or Subcontractor's employee who has engaged in such action. At no change to the Contract Sum or Contract Time, the Contractor shall remove from the Work and Work site any employee or other person pursuant to this Section 3.4.3. Failure to comply with these requirements is grounds for immediate termination of the Agreement for cause.

§ 3.4.3.1 No employees of either the Contractor or any of its Subcontractors of any tier shall harass, intimidate, have physical contact with, or engage in other verbal or physical conduct or communication of a sexual, intimidating or harassing nature with students or the Owner's staff, nor create an intimidating, hostile or offensive environment. The Contractor shall remove from the Work and Work site any employee or other person who has engaged in such actions or who the Owner reasonably considers objectionable at no change to the Contract Sum or Contract Time. Without

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limiting the generality of the foregoing, the Contractor shall ensure by appropriate provisions in each subcontract agreement that the Contractor may remove from the Work and Work site any Subcontractor or Subcontractor's employee who has engaged in such action. At no change to the Contract Sum or Contract Time, the Contractor shall remove from the Work and Work site any employee or other person pursuant to this Section. Failure to comply with these requirements is grounds for immediate termination of the Agreement for cause.

§ 3.4.3.2 Any employees of the Contractor and Subcontractors who will have regularly scheduled unsupervised access to children shall be subject to a record check through the Washington state patrol criminal identification system under RCW 43.43.830 through 834, RCW 10.97.030, and RCW 10.97.050 and through the Federal Bureau of Investigation before the Contractor permits them to have such access to children. The Owner shall also have the right to require such a record check of any employee of the Contractor or a Subcontractor of any tier. The record check shall include a fingerprint check using a complete Washington state criminal identification fingerprint card. The Owner shall provide necessary cooperation associated with required record check. When necessary, applicants may be employed on a conditional basis pending completion of the investigation. If the applicant has had a record check within the previous two years, the Owner or the Contractor may waive the requirement. The Owner, pursuant to chapters 41.59 and 41.56, RCW, shall pay costs associated with the record check as a cost within the instructions to bidders.

§ 3.4.3.3 The Contractor shall develop and administer a system for maintaining site security and tracking all individuals with access to the Project site. All contractors, suppliers, and visitors who come onto school property shall be required to display an identification badge or sticker on their person (such as a hard hat sticker), which shall be provided by the Contractor as part of the Contract Sum. The Contractor shall coordinate the distribution of badges or stickers, shall maintain a list of all contractors, suppliers, and visitors with permission to be on school property (including identifying any personnel required to have a background check pursuant to Section 3.4.3.1 above), and shall make such list available to the Owner or Architect upon request. All badges or stickers shall include a personal identifier (such as a numerical designation), correlated with the Contractor's list of approved personnel and visitors, to allow the Owner or Architect to identify the contractor, supplier, or visitor.

§ 3.4.4 Prevailing Wages.

§ 3.4.4.1 This Contract and this Project are subject to RCW 39.12, Washington's Prevailing Wage Act. Applicable workers must be paid the State prevailing wage rate and are entitled to coverage under the Washington State prevailing wage and labor standards laws. Analysis must be done on a trade classification basis for each worker to ensure that proper wages are paid. Pursuant to RCW 39.12, "Prevailing Wages on Public Works," no worker, laborer, or mechanic employed in the performance of any part of the Work shall be paid less than the "prevailing rate of wage" (in effect as of the date that bids are due) as determined by the Industrial Statistician of the Department of Labor and Industries. The schedule of the prevailing wage rates for the locality or localities where this contract will be performed is attached to the executed contract and made a part of the Contract Documents by reference as though fully set forth herein; if not attached, then the applicable prevailing wages are determined as of the Bid Date for the county in which the Project is located and are available at http://www.lni.wa.gov/TradesLicensing/PrevWage/WageRates/default.asp. A copy is available for viewing at the Owner's office with advance notice, and a hard copy will be mailed upon request. To the extent that there is any discrepancy between the attached or provided schedule of prevailing wage rates and the published rates applicable under WAC 296-127-011, or if no schedule is attached, the applicable published rates as defined by the Department of Labor and Industries shall apply with no increase in the Contract Sum. It is the Contractor's responsibility to ensure that the correct prevailing wage rates are paid. The Contractor shall provide the respective Subcontractors with a schedule of the applicable prevailing wage rates. Questions relating to prevailing wage data should be addressed to the Industrial Statistician upon request.

Mailing Address: Department of Labor and Industries
Prevailing Wage Office
PO Box 44540
Olympia, WA 98504
Telephone: (360) 902-5335
Facsimile: (360) 902-5300

§ 3.4.4.2 Pursuant to RCW 39.12.060, in case any dispute arises as to what are the prevailing rates of wages for work of a similar nature, and such dispute cannot be adjusted by the parties in interest, including labor and management representatives, the matter shall be referred for arbitration to the director of the Department of Labor and Industries of the state, and his or her decision therein shall be final and conclusive and binding on all parties involved in the dispute.

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§ 3.4.4.3 The Contractor shall defend, indemnify and hold the Owner harmless, including attorneys' fees, from any violation or alleged violation by the Contractor or any Subcontractor of any tier of RCW 39.12 ("Prevailing Wages on Public Works") and Chapter 51 RCW ("Industrial Insurance"), including without limitation RCW 51.12.050.

§ 3.4.5 The Contractor shall comply with all applicable provisions of RCW 49.28 ("Hours of Labor").

§ 3.4.6 Pursuant to RCW 49.70, "Worker and Community Right to Know Act," and WAC 296 307 560 et seq., the Contractor shall provide the Owner copies of and have available at the Project Site a workplace survey or material safety data sheets for all "hazardous" chemicals under the control or use of Contractor or any Subcontractor of any tier at the Project Site. The Contractor shall not be entitled to an increase in the Contract Time or Contract Sum arising from its failure or alleged failure to comply with this statute or regulation.

§ 3.4.7 Certified Asbestos-Free and Lead-Free Products: All products and materials incorporated into the Project as part of the Work shall be certified as "asbestos-free" and "lead-free" by United States standards. At the completion of the Project and using the forms included in the Project Manual, the Contractor shall submit Certifications of Asbestos-Free and of Lead-Free Materials certifying that all materials and products incorporated into the Work meet the requirements of this section.

§ 3.4.8 The Contractor shall be responsible for labor peace on the Project and shall at all times use its best efforts and exercise its best judgment as an experienced contractor to adopt and implement policies and practices designed to avoid work stoppages, slowdowns, disputes or strikes where reasonably possible and practical under the circumstances, and shall at all times maintain Project-wide labor harmony.

§ 3.4.9 Materials shall conform to the manufacturer's standards in effect at the date of execution of the Contract Documents and shall be installed in strict accordance with the manufacturer's instructions, specifications and directions. The Contractor shall, if required in writing by the Owner or Architect, furnish satisfactory evidence regarding the kind and quality of any materials identifying thereon the source, and warranting their quality and compliance with the Contract Documents.

§ 3.4.10 Apprenticeship.

§ 3.4.10.1 Pursuant to RCW 39.04.320, no less than fifteen percent (15%) of the Labor Hours shall be performed by apprentices, unless a different amount is permitted or otherwise required by law.

§ 3.4.10.2 Apprenticeship hours shall be performed by participants in training programs approved by the Washington State Apprenticeship Council.

§ 3.4.10.3 "Labor Hours" means the total hours of workers receiving an hourly wage who are directly employed on the site of the public works project. "Labor hours" includes hours performed by workers employed by the Contractor and all Subcontractors working on the Project. "Labor hours" does not include hours worked by foremen, superintendents, owners, and workers who are not subject to prevailing wage requirements of RCW 39.12.

§ 3.4.10.4 During the term of this Contract, the Owner may adjust the apprenticeship labor hour requirement upon its finding or determination that includes:

(1) A demonstration of lack of availability of apprentices in the geographic area of the Project;
(2) A disproportionately high ratio of material costs to labor hours that does not make feasible the required minimum levels of apprenticeship participation;
(3) Demonstration by participating contractors of a good faith effort to comply with the requirements of RCW 39.04.300, 39.04.310 and 39.04.320;
(4) Small contractors or subcontractors (e.g., small or emerging businesses) would be forced to displace regularly employed members of their workforce;
(5) The reasonable and necessary requirements of the Contract render apprentice utilization infeasible at the required level (e.g., the number of skilled workers required and/or limitations on the time available to perform the Work preclude utilization of apprentices); or
(6) Other criteria the Owner deems appropriate, which are subject to review by the office of the Governor.

§ 3.4.10.5 The Contractor shall report apprentice participation to the Owner at least monthly, on forms provided or approved by the Owner. In addition, copies of monthly certified payroll records may be requested to document the

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goal including copies with any birthdates and social security numbers (and any other sensitive personal information) redacted so as such copies may be used to respond to any public records requests. The reports shall include:

(1) The name of the Project;
(2) The dollar value of the Project;
(3) The date of the Contractor's notice to proceed;
(4) The name of each apprentice and apprentice registration number;
(5) The number of apprentices and labor hours worked by them, categorized by trade or craft;
(6) The number of journey level workers and labor hours worked by them, categorized by trade or craft; and
(7) The number, type, and rationale for the exceptions granted.

§ 3.4.10.6 To comply with the changes to RCW 39.04.320 that are effective as of January 1, 2020, the following provisions also apply:

(1) This Section 3.4.10 specifies that the 39.04.320 apprenticeship goals should be met;
(2) The Owner shall provide a monetary incentive of One Thousand Dollars for meeting these goals;
(3) The Contractor shall pay a monetary penalty of One Thousand Dollars for not meeting these goals;
(4) The Owner is not in a position within existing resources to identify an expected cost value to be included in the bid associated with meeting these goals; and
(5) Contractor and its Subcontractors are not required to exceed these apprenticeship utilization requirements.

§ 3.4.11 Certified Payrolls

§ 3.4.11.1 Contractor and its Subcontractors of all tiers shall submit certified payrolls in accordance with RCW 39.12.120.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or explicitly permit otherwise. The Contractor further warrants that the Work will be performed in a skillful and workmanlike manner, will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or explicitly permit. Work, materials, or equipment not conforming to these ~~requirements may be considered defective. The~~ requirements, including substitutions not properly approved and authorized, is considered defective. Unless such actions are caused by or are the responsibility of the Contractor, the Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed or supervised by or through the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Owner or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials ~~and~~ and equipment. The Contractor is not relieved of its general warranty obligations by the specification of a particular product or procedure in the Contract Documents. Warranties in the Contract Documents shall survive completion, acceptance, final payment, and the correction period identified in Section 12.2. The Contractor shall collect, assign, and deliver to the Owner any specific written warranties given by Subcontractors, suppliers, and manufacturers of all tiers. Warranty language shall comply with the Contract Documents and shall be submitted to the Owner and Architect at least thirty days prior to ordering the warranted material or equipment.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4. The Contractor shall secure, assign if requested by the Owner, and furnish directly to the Owner all written warranties required by the Contract Documents, first executed by the applicable Subcontractor and those suppliers and manufacturers furnishing materials for the Work, and subsequently countersigned by the Contractor, which shall extend to the Owner all rights, claims, benefits and interests that the Contractor may have under express or implied warranties or guarantees against the Subcontractor, supplier or manufacturer for defective or non-conforming Work. Prior to furnishing Owner with written guarantees and warranties, the Contractor shall provide copies to the Owner and Architect for review.

§ 3.6 Taxes

The Contractor shall pay all taxes, including but not limited to sales, consumer, B&O, income, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are ~~received or negotiations concluded,~~

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received, whether or not yet effective or merely scheduled to go into effect. The only taxes excluded from the Contract Sum and separately reimbursable are state and local sales taxes on the Contract Sum. Tariffs are not reimbursable and shall not increase the Contract Sum regardless of when implemented.

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the ~~Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses,~~ Owner will pay only for any permits and governmental fees listed as the Owner's responsibility in the Contract Documents, and the Contractor and its Subcontractors of any tier shall secure and pay for, all as a part of the Contract Sum, all other permits, fees, and licenses necessary for the execution of the Work, and inspections by government agencies necessary for proper execution and completion of the Work that are ~~customarily secured after execution of the Contract and~~ legally required at the time bids are ~~received or negotiations concluded.~~received, including without limitation any building permit, all utility connection fees, subcontractor permits and fees including plan check fees for deferred submittals, the application fees and review fees for any and all shop drawings or bidder designed systems, any inspection fees not covered by the initial building permit fee, including reinspection fees, renewals and penalties, and miscellaneous, ancillary and governmental fees, excepting only any permits that the Specifications explicitly indicate the Owner is providing. The Owner will also not pay, and the Contractor will be responsible for and will not be reimbursed for, any license fees or any renewals or penalties.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work. The Contractor shall coordinate and schedule all Work with entities with jurisdiction over the site, permitting agencies, utility companies, and other such agencies determined to have jurisdictional authority necessary for completion of the Work. The Contractor shall keep the Owner informed of communications from these authorities and utilities. The Owner may assist the Contractor with such coordination and scheduling, but the Owner is not responsible for any delays caused by such permitting agencies, utility companies, and other such agencies determined to have jurisdictional authority. The Contractor shall be responsible for providing all information, documents, and fees to the permitting agencies, utility companies, and other such agencies determined to have jurisdictional authority within 30 days after issuance of the Notice to Proceed as necessary to obtain and coordinate permits, utility and other such connections. The Contractor shall obtain all permit renewals during the course of the Work at the Contractor's expense. The Contractor is responsible for providing information and fees to the Department of Labor and Industries.

§ 3.7.3 If the Contractor observes that portions of the Contract Documents are at variance with applicable laws, statutes, ordinances, building codes, rules and regulations, or lawful orders of public authorities, the Contractor shall promptly notify the Architect and Owner in writing, and necessary changes shall be accomplished by appropriate Modification. If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume ~~appropriate~~ responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in any soils reports or other reports made available by the Owner to the Contractor or in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide written notice to the Owner and the Architect before conditions are disturbed and in no event later than ~~14~~ three working days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or ~~both.~~ both, consistent with the requirements of the Contract Documents. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and ~~Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.~~Contractor. Any Claim of the Contractor arising from the Architect's determination or recommendation shall be made in accordance with the dispute resolution procedure in Article 15. No increase to the Contract Sum or the Contract Time shall be allowed if the Contractor knew or reasonably should have known of the concealed conditions prior to it executing the Contract.

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§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall immediately notify the Owner and ~~Architect.~~ Architect by telephone call and email. Upon receipt of such notice, the Owner by telephone call and email shall promptly cooperate with each other and take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations that may affect the human remains, burial markers, archaeological sites or wetlands until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract ~~Time~~ Time, if any, arising from the existence of such remains or features ~~may~~ must be made as provided in Article 15.

§ 3.8 Allowances

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

§ 3.8.2 Unless otherwise provided in the Contract Documents,

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

Allowances are defined in the Contract Documents due to the uncertainty in the scope, price and quantity of the Allowance items at the time the Contract was executed. Whenever actual costs are more or less than the allowance, the Contract Sum will be adjusted accordingly by Change Order. The Contractor must provide the Owner with written notice of its intent to exceed an allowance amount, with estimates and justification (providing the Owner with the opportunity to approve or reject the excess costs), before exceeding an allowance amount.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner ~~with reasonable promptness.~~in sufficient time to avoid delay in the Work.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a computer-literate, experienced, competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The Contractor shall also employ a computer-literate, experienced, competent project manager and project engineer. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. Important communications shall be confirmed in writing. Other communications shall be similarly confirmed on written request in each case. The Contractor shall use an experienced superintendent, who shall be an employee of the Contractor and shall remain on the Project site whenever Subcontractors of any tier are present and not less than eight hours per day, five days per week, unless the job is closed down due to a legal holiday, a general strike, conditions beyond the control of the Contractor, termination of the Contract in accordance with the Contract Documents or unless Final Completion is attained. The project manager shall also be an employee of the Contractor.

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

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objection. Within ten days after issuance of the conditional Notice to Proceed, the Contractor shall also furnish to the Architect and Owner:

.1 A chain-of-command organizational chart which includes all supervisory personnel, including the project manager, the project engineer and the superintendent, assistant superintendent and lead foreman, that the Contractor intends to use on the Work. The chart shall specify any limits of authority for each person, including any limitation on that person's ability to speak for and bind the Contractor, as well as any limits on decision-making authority with respect to specific dollar values, contract time, and issues affecting quality of the Work.

.2 Complete résumés, including all past and current projects, for the project manager, the project engineer and the superintendent. The Owner intends to review the résumés and verify references, and it reserves the right to reject personnel reasonably believed to be unsuitable or incompatible for the Project. The Contractor shall replace any rejected personnel with an agreeable replacement at no increase in the Contract Sum or Contract Time.

.3 A list of telephone numbers for all key personnel of the Contractor and its principal subcontractors for purposes of contacting personnel after hours in the event of an emergency. The list shall be periodically updated as necessary to ensure the Owner has the most current information.

§ 3.9.3 The Contractor shall not employ a proposed project manager, project engineer or superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the ~~superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.~~project manager, project engineer or superintendent without the Owner's consent. The Contractor shall also have available for work on site experienced, skilled workers, such as carpenters, laborers, and erection specialists, to perform work as needed. The Owner reserves the right, after consultation with the Contractor, to require the Contractor to replace a superintendent, project engineer, project manager or other assistants if the Owner determines that such replacement is in the best interests of the Project. The Owner shall exercise such right in a reasonable manner. The Owner shall be entitled to exercise the same rights concerning any replacement.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a ~~Contractor's construction schedule for the Work. The schedule shall~~ preliminary Contractor's construction schedule for the Work consistent with the requirements of the Contract Documents. Prior to submitting its first Application for Payment, the Contractor, after consultation with its Subcontractors, shall submit two hard color copies and an electronic copy of the Contractor's construction schedule consistent with the requirements of the Contract Documents. The Owner may withhold up to ten percent of any progress payment until a satisfactory schedule is submitted. The schedule shall be related to the entire Project and shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; ~~and~~ (3) the time required for completion of each portion of ~~the Work.~~ the Work; and (4) any other information required by the Contract Documents. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at ~~appropriate intervals~~ least monthly and as required by the conditions of the Work and ~~Project.~~Project. The Contractor shall allocate in the schedule of values a separate line item in the amount of at least one-half of one percent (.5%) of the Contract Sum for scheduling, which shall cover both the initial schedule and all monthly updates. The Contractor shall request payment for the monthly update line item with each Payment Application, based upon the percentage completion of the Project. For any month that the Contractor fails to submit an updated schedule, the Contractor shall not be entitled to any payment for scheduling for that month, and the percentage of the scheduling line item represented by that month's percentage of completion of the Work shall be permanently deducted from the Contract Sum by Change Order.

§ 3.10.1.1 Contractor shall promptly notify the Owner and the Architect in writing of any proposed changes in the Contractor's construction schedule or the Contract Time or of any event which could delay performance of any item of the Work, stating the cause of the delay, expected duration of the delay, the anticipated effect of the delay on the Contractor's construction schedule and the action being taken to correct the delay. Notification of potential delay does not constitute a change in the Contract Time; only a Change Order signed by the Owner can amend the Contract Time. The Contractor shall comply with Article 15 with regard to any delays that it believes are the responsibility of the Owner or are otherwise the subject of a Claim for additional Contract Time.

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§ 3.10.1.2 If any Contractor's construction schedule submitted sets forth a date for Substantial Completion for the Work or any phase of the Work beyond the Dates of Substantial Completion established in the Contract Documents (as the same may be extended as provided in the Contract Documents), the Contractor shall submit to the Architect and the Owner for their review and approval a narrative description of the means and methods which the Contractor proposes to use to expedite the progress of the Work to ensure timely completion of the various phases of the Work and the Work as a whole. Regardless of the cause of any delay, the Contractor shall exercise reasonable efforts to bring the Project back into compliance with the Contractor's construction schedule.

§ 3.10.1.3 To the extent that the Contractor or any Subcontractor or material supplier of any tier is responsible for the delay, the Contractor shall take all necessary action to bring the Project back into compliance with the Contractor's construction schedule, including without limitation increasing the number of personnel on the Project and implementing overtime and double shifts at no cost to Owner.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter ~~as necessary to~~ at least monthly maintain a current submittal schedule, shall submit a submittal schedule for the ~~Architect's approval. The Architect's approval~~ Owner's and Architect's review. The Owner's and Architect's review shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated and submitted with the Contractor's construction schedule, and (2) allow the Owner and Architect reasonable time to review submittals in accordance with the Specifications and submittal procedures. The Contractor shall contemporaneously provide the Owner's Project Manager with a copy of all submittals. The Contractor should expect a response time which reflects the complexity and quantity of the submittals being reviewed. Complex, inter-related or multiple submittals will often take longer. Neither the Owner nor the Architect can guarantee response times from governmental authorities, such as permitting agencies or review of any required deferred submittals. If the Contractor fails to submit ~~a~~ and update an acceptable submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in ~~general~~ accordance with the most recent schedules submitted ~~to the Owner and Architect.~~to the Owner and Architect and shall promptly notify the Owner and Architect of any material deviations from those schedules, in particular any deviations that may affect the critical path. The Contractor's Construction Schedule shall be based upon a critical path method ("CPM") analysis of construction activities and sequence of operations needed for the orderly performance and completion of all separable parts of the Work, in the form of a precedence diagram and activity listing and time-scaled, all in accordance with the Contract and within the Contract Time. The Contractor shall utilize scheduling software for its CPM scheduling. The Schedule shall be resource loaded and provided to the Owner in electronic, readable format. It shall include the Date of Commencement, any milestone dates identified in the Specifications, the Date(s) of Substantial Completion, and the Date(s) of Final Completion in accordance with the Contract Documents. The Schedule shall be updated monthly and submitted with the Contractor's Application for Payment. The Critical Path shall be clearly indicated on the Contractor's Construction Schedule.

§ 3.10.4 The Contractor shall not be entitled to any adjustment in the Contract Time, the Contractor's Construction Schedule, or the Contract Sum, or to any additional payment of any sort by reason of the loss or use of any float time, including time between the Contractor's anticipated completion date and end of the Contract Time, whether or not the float time is described as such on the Contractor's Construction Schedule. To ensure that the Owner is substantively aware and effectively able to mitigate any Project delays, the Contractor shall not be entitled to any extension of time, compensable or otherwise, for any delay that occurred during any time the Contractor has not timely submitted an updated Construction Schedule as required by the Contract Documents.

§ 3.10.5 Any float time to activities not on the critical path shall belong to the Project, and may be used by the Project to optimize its construction process. Any float time between the end of the final construction activity and the final completion date shall belong to the Owner, and may be used by the Owner in determining if additional contract days are to be awarded for changes in the contract or for delays to the contract caused by the Owner. The Contractor will not be entitled to any adjustment in the Contract Time, the Construction Schedule, or the Contract Sum, or to any additional payment of any sort by reason of the Owner's use of float time between the end of the final construction activity and the final completion date or be reason of the loss or use of any float time, including time between the Contractor's anticipated completion date and end of the Contract Time, whether or not the float time is described as such on the Contractor's Construction Schedule.

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§ 3.10.6 The Contractor shall attend and participate in and ensure applicable Subcontractors of any tier attend and participate in:

.1 A preconstruction meeting;

.2 Regular weekly on-site Project status meetings scheduled by the Owner or by the Architect to review progress of the Work, to discuss the Contractor's progress reports, to obtain necessary Owner's or Architect's approvals or acceptances, and generally to keep the Owner and Architect informed and involved in the progress of the Project; and

.3 Other meetings scheduled from time to time by the Owner or by the Architect to review progress of the Work and other pertinent matters.

§ 3.11 Documents and Samples at the Site

The Contractor shall maintain at least weekly and make available, at the Project site, a record copy of the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and a record copy of the approved or accepted Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form ~~or~~ and paper copy, available to the Architect and Owner, and delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed. The location of all existing or new hidden piping, valves, conduit, cabling and utilities, as located during the course of construction, shall be appropriately marked until the actual field location dimensions and coordinates are incorporated on the as-built drawings, and mechanical and electrical deviations and changes shall be included. The documents shall include all Architectural, Mechanical, Electrical, Structural, Landscape, and Civil as-built drawings, whether changes occur or not, using Owner-approved drawing/document software. These documents, as well as the approved permit set of plans, shall be available to the Architect and Owner at the site and reviewed with them on a monthly basis. Upon Final Completion of the Work, the Contractor shall transfer all as-built information in a clear and legible manner as described in the Contract Documents and in compliance with all requirements of local governmental entities, shall certify in writing that these documents reflect complete and accurate "as-built" conditions and shall deliver each of the following in a clear, clean and legible manner and in compliance with all requirements of local governmental authorities: (i) complete, integrated copies of the documents in both paper form in good condition and in electronic form in the same format as originally created by the Architect or as electronic .pdf, (ii) the approved permit set of plans, and (iii) the full-size record documents, Shop Drawings, Specifications, Addenda, maintenance manuals and warranties to the Architect for submittal to the Owner in accordance with the provisions of the Contract Documents. Satisfactory maintenance of up-to-date as-built drawings on a monthly basis will be a requirement for approval of progress payments.

§ 3.12 Shop Drawings, Product Data and Samples

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

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

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

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is for the Contractor to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review and approval or acceptance of such submittals by the Owner or the Architect is subject to the limitations ~~of Section 4.2.7. Informational submittals upon which the Architect is~~ of Section 4.2.7 and shall not constitute an approval or acceptance of the Contractor's means and methods or a waiver or modification of any requirement of the Contract Documents. Informational submittals upon which the Owner or the Architect are not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be ~~returned by the~~ (but are not required to be) returned by the Owner or Architect without action.

§ 3.12.5 The Contractor shall be responsible for tracking the status of submittals. The Contractor shall review for compliance with the Contract Documents, ~~approve,~~ note any deviations from the Contract Documents, approve in

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writing, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule ~~approved~~ accepted by the Owner and the Architect or, in the absence of an ~~approved~~ accepted submittal schedule, with reasonable promptness and frequency and in such sequence and uniform flow rate consistent with the submittal schedule as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors. The Contractor shall notify the Owner and Architect of any expedited review required. Submittals which are not marked as reviewed for compliance with the Contract Documents and approved by the Contractor may be returned by the Architect without action, which will not constitute an Owner-caused delay to the Contractor. At the time of submission, the Contractor shall inform the Architect in writing if expedited review is requested or if there is any deviation in the Shop Drawings, Product Data, or Samples from the requirements of the Contract Documents. So far as practicable, each Shop Drawing or Product Data submittal shall bear a cross reference note referring to Drawing or detail numbers on the Drawings showing the same Work in order to facilitate checking of Shop Drawing or Product Data and their prompt return to the Contractor. Shop Drawings for interrelated Work shall be submitted at approximately the same time. Unless otherwise directed in writing, the Contractor shall provide submittals electronically. The Contractor shall keep accurate records of the receipt, review and delivery of all Submittals and shall submit to the Owner reports every other week on the status of their review, identifying the location and the causes of any failure to promptly receive such submissions and suggesting responsibility.

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

.1 Each submittal shall bear a stamp or specific written indication that the Contractor has satisfied its responsibilities under the Contract Documents with respect to the review of the submission. The Contractor must initial each submittal. Submittals that are simply passed through by the Contractor's clerical staff are not sufficient to meet these requirements.

.2 Each submittal shall be accompanied by a completed Submittal Cover Sheet, as included in the Project Manual or provided by the Architect, which shall clearly identify applicable Specification Section and paragraph number(s), material, supplier, pertinent data such as catalog numbers and the use for which it is intended.

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

§ 3.12.8 The Work shall be in accordance with ~~approved~~ accepted submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's review, acceptance or approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect of such deviation at the time of submittal and (1) the Architect has given written ~~approval to~~ acceptance of the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's review, acceptance or approval thereof. Any corrections or modifications to Shop Drawings made by the Architect shall be deemed accepted by the Contractor, without change in Contract Sum or Contract Time, unless the Contractor provides the Architect with written notice at least three working days before commencing any Work from such Shop Drawings and complies with the change procedures in the Contract Documents. The Contractor shall make all corrections requested by the Architect and, when requested by the Architect, provide a corrected Submittal without change in the Contract Sum or Contract Time.

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

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of

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the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

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

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

§ 3.13 Use of Site

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, permits, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment. Materials and equipment on site shall be used directly in the Work and not stored on site after their use is complete. There shall be no use of existing on-site facilities (parking, toilets, etc.) without the Owner's prior approval. Portions of the site may be occupied and in use during construction. The Contractor is responsible to coordinate its Work with any such occupation or use at no increase to the Contract Sum or Contract Time and at no disruption to the occupancy or use.

§ 3.14 Cutting and Patching

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

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

§ 3.14.3 Existing structures and facilities, including but not limited to buildings, landscaping, utilities, topography, streets, curbs, and walks, that are damaged or removed due to excavations or other construction Work of the Contractor, shall be patched, repaired or replaced by the Contractor to the satisfaction of the Architect, the owner of such structures and facilities, and governmental authorities having jurisdiction. In the event the governmental authorities require that the repairing and patching be done with its own labor and/or materials, the Contractor shall abide by such regulations and it shall pay for such Work at no change in the Contract Sum or Contract Time.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area including roads free from accumulation of waste materials and rubbish caused by operations under the Contract. The Contractor shall furnish portable containers on site for use by all trades. At the Owner's request and, in any event, at the completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

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§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the ~~Contractor.~~Contractor for any clean-up costs. The Contractor shall only use waste receptacles provided by the Contractor and shall appropriately dispose of any waste material off site.

§ 3.16 Access to Work

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

§ 3.17 Royalties, Patents and Copyrights

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

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by ~~law, the Contractor shall~~ law and subject to the conditions of this Section 3.18, the Contractor shall defend, indemnify and hold harmless the Owner, its board members, officials, officers, directors, employees, consultants, Project Manager, students, and volunteers, the 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,~~ employees, and the successors and assigns of any of them ("Indemnified Parties") from and against all claims, damages, losses, and expenses, direct and indirect, or consequential, including but not limited to costs, design professional and consultant fees, and attorneys' fees incurred on such claims and in proving the right to indemnification, arising out of or resulting from or connected to 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,~~ Subcontractor of any tier, their agents and anyone directly or indirectly employed by any of them, or anyone for whose acts they may be ~~liable,~~ liable ("Indemnitor"), regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.1.1 The Contractor shall fully defend, indemnify, and hold harmless the Indemnified Parties for the sole negligence of the Indemnitor.

§ 3.18.1.2 If such claims are caused by or are resulting from the sole negligence of the Indemnified Parties, their agents or employees, then the Contractor shall have no duty to defend, indemnify, and hold harmless the Indemnified Parties.

§ 3.18.1.3 If such claims are caused by or are resulting from the concurrent negligence of (i) the Indemnified Parties or the Indemnified Parties' agents or employees, and (ii) the Contractor or the Contractor's agents or employees, then the Contractor shall be obligated to defend, indemnify, and hold harmless the Indemnified only to the extent of the Indemnitor's negligence.

§ 3.18.1.4 The Contractor agrees to being added by the Owner or the Architect as a party to any arbitration or litigation with third parties in which the Owner or Architect alleges indemnification or contribution from the Contractor, any of its Subcontractors of any tier, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable. The Contractor agrees that all of its Subcontractors of any tier shall, in their subcontracts, similarly stipulate; in the event any does not, the Contractor shall be liable in place of such Subcontractor(s) of any tier. To the extent any portion of this Section 3.18 is stricken by a court or arbitrator for any reason, all remaining provisions shall retain their vitality and effect.

§ 3.18.1.5 The obligations of the Contractor under this Section 3.18 shall not be construed to negate, abridge, or otherwise reduce any other right or obligations of indemnity which would otherwise exist as to any party or person

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described in this Section 3.18. To the extent the wording of this Section 3.18 would reduce or eliminate an available insurance coverage of the Contractor or the Owner, this Section 3.18 shall be considered modified to the extent that such insurance coverage is not affected.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a ~~Subcontractor,~~ Subcontractor of any tier, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor of any tier under workers' compensation acts, disability benefit acts, or other employee benefit acts. After mutual negotiation of the parties, the Contractor waives immunity as to the Owner, the Architect, and their respective consultants only under Title 51 RCW, "Industrial Insurance." IF THE CONTRACTOR DOES NOT AGREE WITH THIS WAIVER, IT MUST PROVIDE A WRITTEN NOTICE TO THE OWNER AS A PART OF ITS BID OR THE CONTRACTOR WILL BE DEEMED TO HAVE NEGOTIATED AND WAIVED THIS IMMUNITY.

ARTICLE 4 ARCHITECT

§ 4.1 General

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

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

§ 4.2 Administration of the Contract

§ 4.2.1 The ~~Architect will provide~~ Owner's Project Manager will administer the Owner-Contractor Agreement. The Architect will assist in providing administration of the Contract as described in the Contract Documents and will be an Owner's representative but not the Owner's agent during construction until the date the Architect issues the final Certificate ~~for Payment.~~ for Payment and from time to time during the one year period for correction of Work. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract ~~Documents.~~ Documents, unless otherwise modified in writing in accordance with other provisions of the Contract. Neither the Architect nor the Owner's Project Manager is the agent of the Owner and neither is authorized to agree on behalf of the Owner to changes in the Contract Sum or Contract Time, nor to waive provisions of the Contract Documents, nor to direct the Contractor to take actions that change the Contract Sum or Contract Time.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with and to keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. ~~The Architect will not~~ Neither the Architect nor the Owner will have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents. The presence of the Architect or the Owner at the site shall not in any manner be construed as assurance that the Work is being completed in compliance with the Contract Documents, nor as evidence that any requirement of the Contract Documents of any kind, including notice, has been met or waived. The Contractor shall reimburse the Owner for any amounts paid to the Architect for site visits made necessary by the fault of the Contractor or by defects and deficiencies in the Work.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. ~~The Architect will not~~ Neither the Architect nor the Owner will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. ~~The Architect will not~~ Neither the Architect nor the Owner will have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work. Neither the Architect nor the Owner will be responsible for defining the extent of any subcontract or dealing with disputes between the Contractor and third parties.

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§ 4.2.4 Communications

The Owner and Contractor shall endeavor to include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Contractor shall simultaneously provide the Owner's Project Manager with a direct copy of all written communications the Contractor makes to the Architect, including all notices, requests, transmittals, substitutions, RFIs, Claims, and potential changes in the Contract Sum or Contract Time but not including Shop Drawings, Product Data or Samples. Claims must be directed to the Owner's Designated Representative. The Owner shall endeavor to promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the ~~Contractor.~~ Contractor except as provided in the Contract Documents. Communications by and with Separate Contractors shall be through the ~~Owner.~~ Owner's Project Manager. The Contract Documents may specify other communication protocols. Communications may be simultaneously copied to other recipients.

§ 4.2.5 Based on the Architect's observations and evaluations of the Work and the Contractor's Applications for Payment, the Architect will ~~review and certify~~ make recommendations to and otherwise assist the Owner to determine the amounts due the Contractor and will issue Certificates for Payment in such amounts.

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

§ 4.2.7 The Architect will review and approve, accept, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, ~~and Samples,~~ Samples, and other submittals required by the Contract Documents, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken with reasonable promptness in accordance with the submittal schedule ~~approved~~ accepted by the Architect or, in the absence of an ~~approved~~ accepted submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, weights or gauges, fabrication processes, coordination with the Work of other trades, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval or acceptance of a specific item shall not indicate approval of an assembly of which the item is a component. The Contractor shall clearly note, and the Architect shall not be required to search out for, any deviations from the Contract Documents not clearly identified by the Contractor, nor shall the Architect be required to review partial submissions of those for which submission for correlated items have not been received. Regardless of how a submittal is marked, the Contractor should not presume that the Architect has reviewed a submittal in every aspect.

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

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

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§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor ~~of any change in the~~ in writing of any changes to the duties, responsibilities and limitations of authority of the Project representatives that are described in the Contract Documents. Without such written notification, the duties, responsibilities and limitations of authority of the Project ~~representatives.~~representatives are as described in the Contract Documents.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the ~~Contract Documents~~ Drawings and Specifications and any modifications thereto on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If no agreement is made concerning the time within which interpretations required of the Architect shall be furnished in compliance with this Section 4.2.11, then delay shall not be recognized on account of failure by the Architect to furnish such interpretations until fifteen days after written request is made for them.

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

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

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

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

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

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

§ 5.1.3 A Subcontractor of any tier is a Subcontractor or a Sub-subcontractor.

§ 5.1.4 The designation of terms in this article is not meant to change or alter the definitions contained in RCW 60.28, "Lien for Labor, Materials, Taxes on Public Works," RCW 39.12, "Prevailing Wages on Public Works," or other statutory definitions of a subcontractor for the purposes of such statutes.

§ 5.1.5 Responsible Subcontractor: This designation reflects a person or entity who is qualified and can document training, experience, license, and special certification to perform Work, supply materials, or provide equipment required and specified by the Contract Documents.

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

§ 5.2.1 ~~Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract,~~ Within ten days after the Owner's issuance of the Conditional Notice to Proceed, the Contractor shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the ~~Work,~~ Work (i.e., at least 2% of the Contract Sum), including those who are to furnish materials or equipment fabricated to a special design. ~~Within 14 days of receipt of the information, the~~ The Contractor shall organize this list of Subcontractors in the same

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sequence as the Index of Specification Sheets, and state the Work category followed by the name of the Subcontractor and/or fabricator (or "Contractor" where the portion of the Work is by the Contractor's own forces), including the address, telephone number, individual name of the project contact, and that person's email address. The list shall be accompanied by evidence of any qualifications required within the technical sections of the Project Manual and satisfactory to the Architect and Owner. The list shall be updated promptly as part of the payment process if additional Subcontractors of any tier are engaged. No progress payment will become due until this information is so furnished. No action or inaction of the Owner or Architect in response to receipt of the names of the proposed Subcontractors of any tier shall constitute approval of any Subcontractor of any tier or of its performance. The Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. "Reasonable objection" shall include without limitation lack of "responsibility" of the proposed Subcontractor, as defined in the Contract Documents or the bidding documents, or lack of qualification as required within the bidding documents or the technical sections of the Project Manual. Failure of the Architect to provide notice within ~~the 14-day period~~ a reasonable period of time shall constitute notice of no reasonable objection. If the Owner makes a reasonable objection, the Contractor shall replace the Subcontractor with no increase to the Contract Sum or Contract Time. Such a replacement shall not relieve the Contractor of its responsibility for the performance of the Work and compliance with all of the requirements of the Contract within the Contract Sum and Contract Time.

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

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the ~~Contractor,~~ Contractor or a Subcontractor as not "responsible," the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was qualified, "responsible" and reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be ~~issued before commencement of the substitute Subcontractor's Work.~~ issued. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting ~~names as required.~~qualified names as required and no increase in the Contract Sum or Contract Time shall be allowed for such change (1) if the Owner reasonably concludes that a proposed Subcontractor of any tier has materially failed to perform satisfactorily (such as causing a material delay) on one or more projects for the Owner within three years of the bidding date or is otherwise not "responsible" as defined in the Contract Documents, the bidding documents, or RCW 39.26.160(2) or 39.04, (2) if the proposed Subcontractor is not qualified as required within the technical sections of the Project Manual, or (3) if a proposed Subcontractor is different from the entity listed with the Bid. Such a replacement shall not relieve the Contractor of its responsibility for the performance of the Work or compliance with all of the requirements of the Contract within the Contract Sum and Contract Time. The Contractor's listing or use of any Subcontractor that is not "responsible" shall be sufficient cause for the Owner to declare that the Contractor is not a responsible bidder, unless the Contractor agrees to substitute a responsible Subcontractor at no change to the Contract Sum or Contract Time.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution. If the Owner reasonably concludes that any portion of the Work subcontracted by the Contractor is not being performed in accordance with the Contract Documents, the Contractor shall, upon request of the Owner, remove the Subcontractor performing such Work. This removal shall not relieve the Contractor of its responsibility for the performance of the Work or complying with all of the requirements of the Contract within the Contract Sum and Contract Time, nor shall the Owner be obligated to request any such removal.

§ 5.2.5 The Contractor shall verify responsibility criteria for each first-tier Subcontractor. A Subcontractor of any tier that engages other Subcontractors must verify responsibility criteria for each of its lower-tier Subcontractors. Verification shall include that each Subcontractor, at the time of subcontract execution, meets the responsibility criteria listed in the Instructions to Bidders, Specifications, or other Contract Documents.

§ 5.2.6 The Contractor shall schedule, supervise and coordinate the operations of all Subcontractors of any tier, including any suppliers of early procurement items and any Assigned Subcontractors. No subcontracting of any of the Work shall relieve the Contractor from its responsibility for the performance of the Work in accordance with the Contract Documents or from its responsibility for the performance of any other of its obligations under the Contract

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Documents. The Contractor is responsible for the timely, accurate and appropriate Subcontractor coordination of the Work of lower tier Subcontractors in accordance with the overall Work, including communications, meetings, drawings, illustrations, and other necessary associated activities required for the successful coordination of all trades, schedules, materials and workmanship. The Owner shall provide to the Contractor copies of any written Owner-Supplier agreements to any early procurement contracts, to the extent that such agreements are identified in the Specifications.

§ 5.2.7 The Contractor agrees to diligently, and using its best efforts, cause each Subcontractor of any tier to correct, at that Subcontractor's own expense, all Work performed by the Subcontractor of any tier that is defective in material or workmanship or otherwise fails to conform to the Contract Documents, including all necessary removal, replacement and/or repair of any other portion of the Project which may be damaged in removing, replacing or repairing any portion of the Project. If any Subcontractor of any tier defaults in its obligation promptly to correct any such deficiency, the Contractor shall be responsible for correcting the deficiency.

§ 5.2.8 The Contractor shall provide, and shall cause its Subcontractors of any tier to provide, all required notices and comply with all applicable health and safety laws, rules, regulations, codes and lawful orders of public authorities and of quasi-governmental authorities relating to the Work, including without limitation all OSHA and WISHA requirements, and the Contractor shall, and shall cause applicable Subcontractors of any tier to, indemnify, defend and hold harmless the Owner from and against any and all claims, liabilities, fines and attorneys' fees arising from any failure of the Contractor or a Subcontractor of any tier to have complied with any such requirements in any respect.

§ 5.2.9 The Contractor shall perform with its own organization and under its immediate supervision a portion of the Work, not including general conditions, amounting to not less than the percentage (if any) of the total original Contract Sum specified in the Contract Documents or in the Bidding Documents.

§ 5.3 Subcontractual Relations

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

§ 5.4 Contingent Assignment of Subcontracts

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

- **.1** assignment is effective only after termination of the Contract by the Owner ~~for cause~~ pursuant to Section 14.2 or 14.4 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and ~~Contractor;~~ Contractor in writing; and
- **.2** assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the ~~subcontract.~~subcontract, but only for events and payment obligations that arise after the date of the assignment.

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

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

§ 5.5 LIENS

§ 5.5.1 The Contractor shall promptly pay (and secure the discharge of any liens asserted by) all persons properly furnishing labor, equipment, materials or other items in connection with the performance of the Work (including, but not limited to, any Subcontractors of any tier) to the extent that the Owner has paid the Contractor for such. The Contractor shall furnish to the Owner such releases of liens and Claims and other documents monthly with its payment application to evidence such payment (and discharge). The Owner may, at its option, withhold payment, in whole or in part, to the Contractor until such documents are furnished. The Contractor may provide other security acceptable to the Owner, such as a bond, in lieu of paying disputed liens or Claims.

§ 5.5.2 The Contractor shall defend, indemnify, and hold harmless the Owner from any liens, including all expenses and Architects' and attorneys' fees, except to the extent a lien has been filed because of the failure of the Owner to make a contractually required payment.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

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

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

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

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

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents. If the Contractor receives items from a separate contractor or from the Owner for storage, erection or installation, the Contractor shall acknowledge receipt for items delivered, and thereafter will be held responsible for the care, storage and any necessary replacement of items received.

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

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

§ 6.2.3 The Contractor shall reimburse and indemnify the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor's delays, improperly timed activities or defective construction. ~~The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.~~If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15, except that the Contractor shall have no Claim for such construction or operations to the extent disclosed in the Bidding Documents or Contract Documents or known to the Contractor prior to submitting its bid for the Project. The Contractor is also responsible to coordinate its Work with any other entities performing work on or adjacent to the site, such as work in the right of way and work by utility companies, and the Contractor shall incorporate such work into its construction schedule.

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

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

§ 6.2.6 Should the Contractor or any of its Subcontractors of any tier cause damage of any kind, including but not limited to delay, to any other contractor or Subcontractor on the Project, the Contractor shall, upon due notice, promptly attempt to settle with such other contractor or Subcontractor by agreement or otherwise to resolve the dispute.

§ 6.3 Owner's Right to Clean Up

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

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

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

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

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

§ 7.1.4 Before effectuating a change in the Work or in the Contract Documents, the Owner may, through a Change Order Proposal or similar document, request the Contractor to propose the amount of change in the Contract Sum, if any, and the extent of change in the Contract Time, if any, arising from the proposed change in the Work. The Contractor shall submit its responsive proposal as soon as possible and within ten days, and shall in good faith specify the components and amounts by which the Contract Sum and/or Contract Time would change. Labor, materials and equipment shall be limited to and itemized in the manner described in Section 7.5 of these General Conditions. If the Contractor fails to respond within this time, the Owner may withhold some or all of a progress payment otherwise due until the tardy proposal is received. If the Owner explicitly accepts the proposal in writing, the Owner and the Contractor will be immediately bound to the terms of the proposal, the change will be included promptly in a future Change Order, and the change in the Work described in the proposal shall commence expeditiously. The Owner may reject the proposal, in which case the Owner may either not effectuate the change in the Work or may order the change

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through a Construction Change Directive or supplemental instruction or an order for a minor change in the Work. The Architect and the Owner may confer directly with Subcontractors of any tier concerning any item proposed to the Owner under this Article.

§ 7.1.5 If the Contractor adds a reservation of rights that has not been initialed by the Owner to any Change Order, Construction Change Directive, Change Order proposal, Application for Payment or any other document, all amounts and all Work therein shall be considered disputed and not due or payable unless and until costs are re-negotiated or the reservation is withdrawn or changed in a manner satisfactory to and, in all cases, initialed by the Owner. If the Owner makes payment for a Change Order or an Application for Payment that contains a reservation of rights not initialed by the Owner to indicate agreement with the reservation, and if the Contractor negotiates the check for or otherwise accepts such payment, then the reservation of rights shall be deemed waived, withdrawn and of no effect.

§ 7.2 Change Orders

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

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

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly. The Owner's use of a Construction Change Directive does not constitute agreement that the directive constitutes a change in the Work, the Contract Sum, or the Contract Time. The Owner or Architect may also issue a Field Authorization, or the Owner, Architect, and Contractor may agree to a Construction Change Authorization, to effectuate Changes in the Work. For any change in the Work, whether initiated by a Construction Change Directive, Field Authorization, Construction Change Authorization, or a Change Order Proposal, the Contractor must submit its proposed price and any proposed extension of the Contract Time to the Owner within ten days of the date of the Construction Change Directive, Field Authorization, Construction Change Authorization, or a Change Order Proposal. If the Contractor fails to submit a proposed price and time within the time periods required by the Contract Documents, the Owner may establish what it believes to be the fair price of the changed Work, and any additional Contract Time, and this price and time submitted by the Owner shall be final and binding upon the parties, as if they had signed a Change Order in this amount, without recourse to submitting any claims or litigation. Payment for any Changes to the Work shall not exceed the labor and equipment indicated on the daily work logs.

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

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following ~~methods:~~methods or as mutually agreed in writing by the Owner and Contractor:

- **.1** Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- **.2** Unit prices stated in the Contract Documents or subsequently agreed upon;
- **.3** Cost to be determined in a manner agreed upon by the parties (accompanied by the Contractor's itemized estimate of probable cost) and a mutually acceptable fixed or percentage fee; or
- **.4** As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, ~~the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present,~~ or if the cost is to be determined under Section 7.3.3.3, the Contractor shall provide a not-to-exceed price for the Construction Change Directive Work within fourteen days of receipt of the Construction Change Directive, and the Contractor shall keep and present, itemized in

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the categories of Section 7.5 and in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. ~~Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:~~

~~.1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;~~

~~.2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;~~

~~.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;~~

~~.4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and~~

~~.5 Costs of supervision and field office personnel directly attributable to the change.~~

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor ~~may~~ must provide notice and make a Claim in accordance with applicable provisions of Article ~~15.~~15 or such claim will be waived.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and as soon as possible, and within seven days of receipt, the Contractor shall advise the Architect and Owner in writing of the Contractor's agreement or disagreement with the proposed adjustment or the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time. The Contractor's response shall reasonably specify the reasons for its disagreement and the adjustment or other terms that it proposes. Without such timely written response, the Contractor shall conclusively be deemed to have accepted the Owner's adjustment. The Contractor's disagreement shall not relieve the Contractor of its obligation to comply promptly with any written notice issued by the Owner or the Architect. The adjustment shall then be determined by the Architect in accordance with the provisions of the Contract Documents. The ultimate adjustment shall not exceed the larger amount submitted.

§ 7.3.6.1 In order to facilitate checking of such quotations, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by complete itemization of costs, including labor, equipment, material and subcontract costs. Labor, equipment and materials shall be itemized in the manner described in Section 7.5. When major cost items arise from Subcontractors of any tier, these items shall also be similarly itemized. Approval may not be given without such itemization. Failure to provide data within twenty-one days of the Owner's or Architect's request shall constitute waiver of any Claim for changes in the Contract Time or Contract Sum. The total cost of any change, including a Claim under Article 15, shall be limited to the reasonable value, as determined by the Owner (subject to appeal through the dispute resolution procedure of Article 15), of the items in Section 7.5. Unless otherwise agreed in writing by the Owner, the cost shall not exceed the lower of the prevailing cost for the Work in the locality of the Project or the cost of the Work in the current edition of R.S. Means Company, Inc., Building Construction Cost Data as adjusted to local costs and conditions. The Architect and the Owner may communicate directly with Subcontractors of any tier concerning costs of any Work included in a Construction Change Directive. If the Contractor disagrees with the method or the adjustment in the Contract Time, the adjustment or method shall be referred to the Architect for determination, and any adjustment shall be limited to the change in the actual critical path of the Contractor's Construction Schedule directly caused thereby.

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

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be the largest of (i) the reasonable and prevailing value of the deletion or change, (ii) the line item value in the Schedule of Values, or (iii) the actual net cost as confirmed by the ~~Architect.~~ Owner. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, ~~the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be~~

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~~reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.~~and provided that any reservations of rights regarding the Construction Change Directive have been initialed by the Owner, amounts not in dispute for such changes in the Work may be included in Applications for Payment accompanied by a Change Order indicating the parties' agreement with part or all of such costs.

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

§ 7.4 Minor Changes in the Work

The Architect or the Owner may order minor changes in the Work (sometimes called a Design Clarification) that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's or Owner's order for minor changes shall be in writing. The Contractor shall carry out such written orders promptly. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Owner and Architect and shall not proceed to implement the change in the ~~Work.~~ Work unless directed otherwise in writing by the Owner. If the Contractor continues to believe that such order, or the response to a Request for Information, causes an increase in the Contract Sum or Contract Time, the Contractor must properly submit a notice and Claim pursuant to Article 15. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Owner and Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

§ 7.5 PRICING COMPONENTS

§ 7.5 The total cost of any Change in the Work or of any other increase or decrease in the Contract Sum, including a Claim, shall be limited to the following components:

§ 7.5.1 Direct labor costs: These are the labor costs determined by the number of additional craft hours and the hourly costs necessary to perform the change in the Work. The hourly cost shall be based upon the following:

.1 Basic wages and fringe benefits: The hourly wage (without markup or labor burden) and fringe benefits paid as established by the Washington Department of Labor and Industries or contributed to labor trust funds as itemized fringe benefits, whichever is applicable, not to exceed that specified in the applicable "Intent to Pay Prevailing Wage" for the laborers, apprentices, journeymen, and foremen performing and/or directly supervising the Change in the Work on the site. The premium portion of overtime wages is not included unless pre-approved in writing by the Owner. Costs paid or incurred for vacations, per diem, subsistence, housing, travel, bonuses, stock options, or discretionary payments to employees are not separately reimbursable. The Contractor shall provide copies of certified payrolls for itself and Subcontractors of any tier upon the Owner's request.

.2 Workers' insurances: Direct contributions to the State of Washington as industrial insurance; medical aid; and supplemental pension by class and rates established by the Washington Department of Labor and Industries.

.3 Federal insurances: Direct contributions required by the Federal Insurance Compensation Act (FICA); Federal Unemployment Tax Act (FUTA); and State Unemployment Compensation Act (SUCA).

Upon the Owner's request, the Contractor shall substantiate all claimed wage rates and shall provide a breakdown of the various components of the labor costs in a form provided or approved by the Owner.

§ 7.5.2 Direct material costs: This is an itemization, including material invoice, of the quantity and cost of additional materials reasonable and necessary to perform the change in the Work. The unit cost shall be based upon the net cost after all discounts or rebates, freight costs, express charges, or special delivery costs, when applicable. No lump sum costs will be allowed except when approved in advance by the Architect and the Owner. If the Contractor is offered discounts and/or rebates based upon prompt payment, the Contractor shall offer the Owner the opportunity to take advantage of such discount and/or rebate, and if the Owner makes such a prompt payment then the Owner shall only be charged the price as reduced by the discount and/or rebate. If the Owner declines the opportunity the Contractor may keep any such discounts and/or rebates it achieves through its own prompt payment. If the Contractor does not

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provide the Owner the opportunity to participate then the Contractor may only charge the net costs after consideration of discounts and rebates.

§ 7.5.3 Construction equipment usage costs: This is an itemization of the actual length of time that construction equipment appropriate for the Work will be used solely on the change in the Work at the site times the applicable rental cost as established by the lower of the local prevailing rate published in The Rental Rate Blue Book by EquipmentWatch, Atlanta, Georgia (copies of which shall be provided to the Owner), as modified by the AGC/WSDOT agreement or the actual, reasonable rate paid to unrelated third parties as evidenced by rental receipts. Rates and quantities of equipment rented that exceed the local fair market rental costs shall be subject to the Owner's prior approval. Total rental charges for equipment or tools shall not exceed 75% of the fair market purchase value of the equipment or the tool. Actual, reasonable mobilization costs are permitted if the equipment is brought to the Site solely for the change in the Work. If more than one rate is applicable, the best available rate shall be utilized. The rates in effect at the time of the performance of the changed Work are the maximum rates allowable for equipment of modern design and in good working condition and include full compensation for furnishing all fuel, oil, lubrication, repairs, maintenance, and insurance to the same extent as the comparable Blue Book or fair market rate. Equipment not of modern design and/or not in good working condition shall have lower rates. Hourly, weekly, and/or monthly rates, as appropriate, shall be applied to yield the lowest total cost. When rental rates payable do not include fuel, lubrication, maintenance, and servicing, as defined as operating costs in the Blue Book, such operating costs shall be reimbursed based on actual costs. The rate for equipment necessarily standing by for future use on the changed Work shall be no more than 50% of the rate established above. If equipment is required for which a rental rate is not established by Blue Book, an agreed rental rate shall be established for that equipment, which rate and use must be approved by the Owner prior to performing the Work.

§ 7.5.4 Cost of change in insurance or bond premium: This is defined as:

.1 Contractors' liability insurance: The actual cost (expressed as a percentage submitted with the certificate of insurance provided under Section 11.1.1.2, and subject to audit) of any changes in the Contractor's liability insurance arising directly from the changed Work, which shall not exceed 1% of the cost of the Changed Work; and

.2 Public works bond: The actual cost (expressed as a percentage submitted with evidence of bondability under Section 11.1.2, and subject to audit) of the change in the Contractor's premium for the Contractor's statutorily required performance and payment bond arising directly from the changed Work, which shall not exceed 1% of the cost of the Changed Work, and any such premiums for the Changed Work on Subcontractor bonds that have been contractually required by the Owner. The Contractor is not entitled to any increased premium on any retainage bond or any Subcontractor bond not contractually required by the Owner, as such bonds are optional.

Upon request, the Contractor shall provide the Owner with supporting documentation from its insurer or surety of any associated cost incurred.

§ 7.5.5 Subcontractor costs: These are payments the Contractor makes to Subcontractors for changed Work performed by such Subcontractors. The Subcontractors' cost of changed Work shall be determined in the same manner as prescribed in this Section 7.5.

§ 7.5.6 Fee: This is the percentage amount to cover all combined overhead, profit and other costs, including all office, home office and site overhead (including facilities, purchasing, clerical, project manager, project engineer, other engineers, project foreman, estimator, superintendent and their vehicles and assistants), taxes (except for sales tax), employee per diem, subsistence and travel costs, warranty, safety costs, printing and copying, quality control/assurance, purchasing, small or hand tool (a tool that costs $500 or less and is normally furnished by the performing contractor) or expendable charges, preparation of as-built drawings, impact on unchanged Work, Change Order and Claim preparation, and delay and impact costs of any kind (cumulative, ripple, or otherwise). No such costs may be added to the total cost to the Owner of any Change Order, Construction Change Directive, Claim or any other claim of any kind on this Project. No Fee shall be due, however, for direct settlements after Substantial Completion by the Owner of Subcontractor claims. The Fee shall be limited in all cases to the following schedule:

.1 The Contractor shall receive 12% of the cost of any materials supplied or Work properly performed by the Contractor's own forces.

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.2 The Contractor shall receive 8% of the amount owed (less fee) directly to a first-tier Subcontractor or first-tier supplier for materials supplied or for Work properly performed by that Subcontractor or supplier.

.3 Each Subcontractor of any tier shall receive 12% of the cost of any materials properly supplied or Work performed by its own forces.

.4 Each Subcontractor of any tier shall receive 6% of the amount (less fee) it properly incurs for materials supplied or Work properly performed by its suppliers or subcontractors of the next lower tier.

.5 The Contractor and its Subcontractors of any tier shall receive 5% of any amounts owed to any remote, sub-tier subcontractors which are within the lines of contractual responsibility but not in privity of contract with such Contractor or Subcontractors, for Work performed by that remote, sub-tier subcontractor.

.6 The cost to which this Fee is to be applied shall be determined in accordance with Section 7.5.1 through 7.5.4.

.7 The total summed Fee of the Contractor and all Subcontractors of any tier shall not exceed 23% of any amounts owed to any remote, lower-tier Subcontractors that are within the lines of contractual responsibility but not in privity of contract with such Contractor or Subcontractor(s), for Work performed by that remote, lower-tier Subcontractor. If the Fee would otherwise exceed 23%, the Contractor shall proportionately reduce the Fee percentage for the Contractor and all Subcontractors except for the Subcontractor supplying material or performing Work with its own forces. None of the fee percentages authorized in this Section 7.5.6 may be compounded with any other fee percentage or percentages authorized in this Section.

If a change in the Work involves both additive and deductive items, the appropriate Fee allowed will be added to the net difference of the items. If the net difference is negative, no Fee will be added to the negative figure as a further deduction. If the changed Work is performed by a wholly-owned subsidiary or by a company with common ownership interests (i.e., at least 50% similar ownership) of the Contractor or any Subcontractor, then only the entity performing the changed Work may receive a Fee per the above schedule and the higher-tier company shall not be entitled to any Fee. The parties acknowledge that the fees listed in this Section 7.5.6 are substantially greater than the fees and overhead normally included in determining the Contract Sum bid; that these higher percentages are a sufficient amount to compensate the Contractor for all effects and impacts of Changes in the Work; and that the resultant overcompensation of the Contractor for some Changes compensates the Contractor for any Changes for which the Contractor believes the percentage is otherwise insufficient.

§ 7.5.7 The Owner and Contractor agree that the cost of any changed Work or of any other increase or decrease in the Contract Sum, including a Claim, shall not include, among other similar costs, consultant costs, attorneys' fees, or Claim preparation expenses, as such matters are not recoverable from the Owner.

ARTICLE 8 TIME

§ 8.1 Definitions

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

§ 8.1.2 The date of commencement of the Work is the date established ~~in the Agreement.~~by the Owner in its conditional notice to proceed issued for each phase of the Work. Work on the site may begin for a phase when the Contractor complies with the requirements of the notice to proceed. The date of commencement of all the Work is the date established by the Owner in its first conditional notice to proceed issued for a phase of the Work.

§ 8.1.3 The date of Substantial Completion (or a designated portion thereof) is the date set by the Owner and certified by the Architect in accordance with Section 9.8.

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

§ 8.2 Progress and Completion

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

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

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract ~~Time.~~Time and shall achieve Final Completion within sixty days thereafter (or such other period of time for specific phases as is specified in the Contract Documents).

§ 8.2.4 THE TIMELY COMPLETION OF THIS PROJECT IS ESSENTIAL TO THE OWNER. The Owner will incur serious and substantial damages if Substantial Completion of the Work does not occur within the Contract Time; however, it would be difficult if not impossible to determine the amount of such damages, which could include, for example, personnel and overtime costs, transportation costs, governmental fees, storage costs, portable rental costs, loss of use, and lost opportunities. Consequently, provisions for liquidated damages as a reasonable estimate of loss may be included in the Contract Documents. The Owner's right to liquidated damages is not affected by partial completion, occupancy, or beneficial occupancy. The Contractor shall furnish sufficient forces, construction plant and equipment, and shall work such hours, including night shifts, overtime operations and weekend and holiday work as may be necessary to insure the completion of the Work in accordance with the date of Substantial Completion and the accepted Contractor's Construction Schedule. If the Contractor fails to perform in a timely manner in accordance with the Contract Documents and, through the fault of the Contractor or Subcontractor(s) of any tier fails to meet the Contractor's Construction Schedule, the Contractor shall take such steps as may be necessary to immediately improve its progress by increasing the number of workers, shifts, overtime operations or days of work (to the extent allowable under local hours of work ordinances) or other means and methods, all without additional cost to the Owner.

§ 8.2.5 If the Work is to be performed in phases, with separate dates set forth for Substantial Completion elsewhere in the Contract Documents, then the specified liquidated damages shall apply separately to each such phase unless otherwise specified.

§ 8.2.6 Any provisions in the Contract for liquidated damages are intended to be in lieu of the liability of the Contractor for special, incidental and consequential damages (such as cost of capital and loss of profits, use and revenue) sustained by the Owner but shall not relieve or release the Contractor from liability for any and all damage or damages suffered by the Owner due to other breaches of the Contract or suffered by separate contractors.

§ 8.2.7 It is the Contractor's option, but not its right, to attempt to complete the Project earlier than the dates specified in the Contract Documents. Thus any Claim based upon delay shall be evaluated based upon the dates specified in the Contract Documents, not an earlier projected completion that the Contractor may propose.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the ~~Work;~~ ~~(3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties,~~ Work only to the extent reflected in approved Change Orders providing for specific extensions of the Contract Time; (3) by unexpected industry-wide labor disputes, fire, seismic event, unusual delay in deliveries, governmental delays (including unanticipated permit delays not caused by the Contractor); delays caused by a local jurisdictions' scheduled days off shall not be considered an excusable delay), unavoidable casualties, unanticipated, abnormal and adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the ~~Architect~~ Owner determines, justify delay, then the Contract Time shall be extended ~~for such reasonable time as the Architect may determine.~~by Change Order for such reasonable time, limited to the change in the actual critical path of the Contractor's Construction Schedule directly caused thereby, as the Owner may determine consistent with the provisions of the Contract Documents. In no event, however, shall the Contractor be entitled to any extension of time absent proof of (1) delay to an activity on the critical path of the Contract Schedule, so as to actually delay the Project completion beyond the date of Substantial Completion, or (2) delay transforming an activity into the critical path of the Contract Schedule, so as to actually delay the Project completion beyond the date of Substantial Completion.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article ~~15.~~15 and shall include any proposed changes in the Contractor's Construction Schedule or the Contract Time, a description of any event that could delay performance or supplying of any item of the Work, the expected duration of the delay, the anticipated effect of the delay on the Contractor's Construction Schedule, and the action being taken to correct the

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delay situation. That the Owner or the Architect may be aware of the occurrence or existence of a delay through means other than the Contractor's written notification shall not constitute a waiver of a timely or written notice or Claim. The Contractor has an obligation to minimize and mitigate schedule impacts.

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

.1 If the delay was not caused by the Owner, the Contractor, a Subcontractor of any tier, or the Architect, or anyone acting on behalf of any of them, the Contractor is entitled only to an increase in the Contract Time in accordance with the Contract Documents but not an increase in the Contract Sum. If the delay was caused by the Contractor, a Subcontractor of any tier, or anyone acting on behalf of any of them, the Contractor is not entitled to an increase in the Contract Time or in the Contract Sum. The Contractor shall be entitled to a change in the Contract Sum only if the delay was caused by the Owner or the Architect, or anyone acting on behalf of them. The Contractor shall not recover damages, an equitable adjustment or an increase in the Contract Sum or Contract Time from the Owner where the Contractor could have reasonably avoided the delay by the exercise of due diligence. The Contractor shall be able to recover an increase in the Contract Sum, provided it is consistent with the terms of the Contract Documents, only if the delay directly impacts the critical path, could not have reasonably been avoided, was unreasonable and was caused by the Owner or anyone acting on its behalf as permitted under the Contract Documents. The Owner is not obligated directly or indirectly for damages, an equitable adjustment, or an increase in the Contract Sum for any delay suffered by a Subcontractor of any tier that does not increase the Contract Time.

.2 In the event the Contractor (including any Subcontractors of any tier) is held to be entitled to damages from the Owner for delay beyond the payment permitted in Section 7.5.6, it is agreed that the total combined damages to the Contractor and any Subcontractors of any tier for each day of delay shall not exceed the daily liquidated damage rate specified in the Contract Documents due the Owner for the Contractor's delay in achieving Substantial Completion. By submitting its bid on the Work and executing the Agreement, the Contractor represents that it would be difficult if not impossible to determine the amount of any delay damages due it, that it has taken this provision for liquidated damages (as a maximum daily delay amount) into consideration in its bid, and that these liquidated damages are a reasonable estimate of the maximum amount of its loss. No damages shall be allowed for any time prior to fourteen days before receipt of written notice of the Claim of the delay pursuant to Article 15.

.3 The Contractor shall not in any event be entitled to damages arising out of actual or alleged loss of efficiency; morale, fatigue, attitude, or labor rhythm; constructive acceleration; home office overhead; expectant underrun; trade stacking; reassignment of workers; rescheduling of work, schedule compression; concurrent operations; dilution of supervision; learning curve; beneficial or joint occupancy; logistics; ripple; season change; extended or expanded overhead or general conditions; profit upon damages for delay; impact damages; cumulative impacts; or similar damages. Any effect that such alleged costs may have upon the Contractor or its Subcontractors of any tier is fully compensated through the percentage Fee on Change Orders paid through Section 7.5.6 and any liquidated damages paid hereunder.

.4 The Contractor shall not be entitled to any adjustment in the Contract Time or the Contract Sum, or to any additional payment of any sort, by reason of the loss or the use of any float time, including time not on the critical path or time between the Contractor's anticipated completion date and the end of the Contract Time, whether or not the float time is described as such on the Contractor's Construction Schedule.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

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

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed (e.g., more than fifty percent) so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices but not the Contract Time or any other portion of the Contract Sum shall be equitably adjusted.

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§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect at least fourteen days before the first Application for Payment, allocating the entire Contract Sum to the various portions of ~~the Work.~~ the Work so that the schedule of values totals to the Contract Sum. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Owner or Architect. At a minimum, the Work shall be itemized by Specification section or system, separate values for labor, materials and equipment shall be provided, and line items on the schedule of values shall be tied to the Contractor's schedule. Quantities shall be provided for each section or system of the Work. The Contractor shall itemize and prepare the schedule of values for approval by the Owner with respect to form, content, and level of detail. This schedule, unless objected to by the Owner or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Owner and Architect and supported by such data to substantiate its accuracy as the Owner or Architect may require, and unless objected to by the Owner or Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

.1 Mobilization shall be a maximum of one-half of one percent (0.5%) of the Contract Sum, and shall be paid only if supported by an itemized breakdown of costs acceptable to the Owner.

.2 Payment applicable to the expenses of the payment and performance bond and for any required builder's risk insurance will be made only upon receipt of paid invoices from the surety and insurance carrier.

.3 No payment will be made for shop drawings or submittals until on-site receipt of materials, except for structural steel, fire sprinkler, automatic temperature control, and fire alarm shop drawings that have been reviewed and accepted by the Architect.

.4 The schedule of values shall allocate at least one percent (1%) of the Contract Sum to Commissioning of Operational Systems, as defined in the Contract Documents.

.5 The schedule of values shall also allocate at least two percent (2%) of the initial Contract Sum as a separate line item for that portion of the Work between Substantial Completion and Final Completion to be entitled "Final Documentation and Punchlist Completion," including without limitation punchlist completion and furnishing all deliverables, which will be earned and distributed as follows: half shall be allocated for the completion of the punchlist work; one quarter shall be allocated for completion of approved operations and maintenance data as defined in the Contract Documents; and one quarter shall be allocated for completion of approved record documents, warranties and bonds, delivery of extra stock, and all other documentation or items of the Work required for Final Completion and final payment. This percentage is not the statutory retainage described in Section 9.3.4 or any other retainage but rather requires the Contractor to recognize that the Contractor and its Subcontractors will expend significant costs in advancing the Work from Substantial Completion to Final Completion, and that this amount is not earned until Final Completion of the Work is accomplished. At its sole discretion, the Owner may release portions of these amounts progressively as items are completed.

.6 Itemize separately line item costs for permits, bonds, insurance, layout and supervision, scheduling, and temporary facilities.

§ 9.3 Applications for Payment

§ 9.3.1 ~~At least ten days before the date established for each progress payment, the~~ Progress payments will be made monthly for Work duly certified, approved, and performed during the calendar month preceding the application. These amounts are paid in trust to the Contractor for distribution to Subcontractors to the extent and in accordance with the approved Application for Payment. The Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of ~~values, if required under Section 9.2,~~ values for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, shall meet the requirements of this Article 9, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 Draft Application. Within the first ten (10) days of each month, the Contractor shall submit to the Architect a report on the current progress of the Work as compared to the Contractor's Construction Schedule, and a draft, itemized application for payment for Work performed during the prior calendar month on a form supplied or approved by the Owner. This shall not constitute a payment request. The Contractor, the Architect and the Owner shall meet within the next ten (10) days and confer regarding the current progress of the Work and the amount of payment to which the Contractor is entitled. The Architect or the Owner may request the Contractor to provide data substantiating the Contractor's right to payment as the Owner or the Architect may require, such as copies of requisitions from

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Subcontractors of any tier, lien releases, and certified payroll records, and reflecting retainage as provided elsewhere in the Contract Documents. The Contractor shall not be entitled to make a payment request, nor is any payment due the Contractor, until such data is furnished. As provided in Section 7.3.9, such applications ~~may~~ may, if payment is approved by the Owner and the Architect, include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Owner with the assistance of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Payment Request. Within seven (7) days after the Contractor, the Owner and the Architect have met and conferred regarding the updated draft application, and the Contractor has furnished all progress information required and all data requested by the Architect under Section 9.3.1.1 above, the Contractor has submitted current meeting minutes, as-built drawings and commissioning logs (if requested) and an updated construction schedule, the Contractor may submit a payment request by the 10th day of the following month in the agreed-upon amount, in the form of a notarized, itemized Application for Payment, in triplicate, for Work properly performed during the prior calendar month on a form supplied or approved by the Owner. The Application shall also state that prevailing wages have been paid in accordance with the pre-filed statements of intent to pay prevailing wages on file with the Owner and that all payments due Subcontractors of any tier from the Owner's payment the prior month have been made. The submission of this Application constitutes a certification that the Work is current on the Contractor's Construction Schedule, unless otherwise noted on the application. The Application shall be accompanied by lien releases on a form furnished or approved by the Owner from each Subcontractor for whose Work the Owner paid the Contractor for the prior month. Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay. A payment request shall not be valid unless it complies with the requirements of the Contract Documents.

§ 9.3.1.3 Disputed Amounts. If the Contractor believes it is entitled to payment for Work performed during the prior calendar month in addition to the agreed-upon amount, the Contractor may, also within the same seven (7) days after the meeting in Section 9.3.1.1, submit to the Owner and the Architect along with the approved payment request a separate payment request in writing specifying the exact additional amount due, the category in the schedule of values in which the payment is due, the specific Work for which the additional amount is due, and why the additional payment is due. Furthermore, for the submittal to be considered, pursuant to WAC 296-127-320, the Contractor and all Subcontractors shall file with the Owner by the same date certified copies of all payroll records relating to the additional amount due.

§ 9.3.1.4 Validity of Payment Requests. A payment request shall not be valid unless it complies with the requirements of the Contract Documents. If a separate payment request concerning a disputed amount does not comply with the requirements of the Contract, the Owner will provide a written statement to the Contractor stating why the disputed amount is not owed and/or why the separate payment request does not comply with the requirements of the Contract.

§ 9.3.1.5 Payments to Subcontractors. No payment request shall include amounts the Contractor does not intend to pay to a Subcontractor because of a dispute or other reason. If, after making a request for payment but before paying a Subcontractor for its performance covered by the payment request, the Contractor discovers that part or all of the payment otherwise due to the Subcontractor is subject to withholding from the Subcontractor under the subcontract (such as for unsatisfactory performance or non-payment of sub-subcontractors), the Contractor may withhold the amount as allowed under the subcontract, but it shall give the Subcontractor, the Owner and the Architect written notice of the remedial actions that must be taken as soon as practicable after determining the cause for the withholding but before the due date for the Subcontractor payment, and pay the Subcontractor within eight working days after the Subcontractor satisfactorily completes the remedial action identified in the notice.

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

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§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of ~~payment.~~ payment (except that title to demolition removed from the site shall not pass to the Owner). The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

§ 9.3.4 Retainage.

§ 9.3.4.1 In accordance with RCW 60.28, a sum equal to five percent (5%) of each approved Application for Payment shall be retained. After award of a Contract for public improvements, or work for which retained percentages are required to be reserved under the provision of RCW 60.28, the Owner shall require the Contractor to exercise, in writing, one of the options listed below:

.1 Retained percentages will be retained in a fund by the Owner not subject to release until sixty days following the Final Acceptance of the Work as completed and as provided in Section 9.10.6; or

.2 Deposited by the Owner in an interest-bearing account in a bank, mutual savings bank or savings and loan association and not subject to release until sixty days following Final Acceptance of the Work as completed and as provided in Section 9.10.6; or

.3 Placed in escrow with a bank or trust company and not subject to release until sixty days following the Final Acceptance of the Work as completed and as provided in Section 9.10.6.

.4 If the Contractor provides a bond in place of retainage, it shall be in an amount equal to 5% of the Contract Sum plus change orders. The minimum requirements for the bond are that it must be on a form acceptable to the Owner, with an A.M. Best rating of "A-" or better and a financial rating of no less than "VII," and signed by a surety registered by the Washington State Insurance Commissioner and on the currently authorized insurance list published by the Washington State Insurance Commissioner; additional requirements as established by the Owner may be applied.

§ 9.3.4.2 The Contractor or a Subcontractor may withhold payment of not more than five percent (5%) as retainage from the monies earned by any Subcontractor or Sub-subcontractor, per RCW 60.28, provided that the Contractor pays interest to the Subcontractor at the same interest rate it receives from its reserved funds. If requested by the Owner, the Contractor shall specify the amount of retainage and interest due a Subcontractor.

§ 9.4 Certificates for Payment

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

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

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§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Owner may, with or without the Architect's concurrence, withhold payment, and the Architect may also withhold a Certificate for Payment or, because of subsequent observations or subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

.1 defective Work not remedied;

.2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;

.3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;

.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

.5 damage to the Owner or a Separate Contractor;

.6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; ~~or~~

.7 ~~repeated~~ unsatisfactory prosecution of the Work by the Contractor, including but not limited to failure to carry out the Work in accordance with the Contract Documents

.8 delay by the Contractor and/or its Subcontractor(s) of any tier, or failure to comply with the Contractor's Construction Schedule requirements;

.9 failure to submit affidavits pertaining to wages paid as required by statute;

.10 failure to submit a properly updated Construction Schedule;

.11 failure to comply with a requirement of the Contract Documents in which the Owner has reserved the right to withhold payment;

.12 liquidated damages;

.13 failure to properly maintain and submit as-builts;

.14 failure to properly submit daily construction records;

.15 failure to properly submit certified payrolls; or

.16 failure to properly submit any other documents required of the Contractor under the Contract Documents.

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

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

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

§ 9.5.5 Pursuant to RCW 39.12, "Prevailing Wages on Public Works," the Contractor will not receive any payment until the Contractor and all Subcontractors of any tier for whom payment is sought have submitted state-approved "Statements of Intent to Pay Prevailing Wage" to the Owner. The statement must have the approval of the Industrial Statistician of the Department of Labor and Industries before it is submitted to the Owner. The statement must include the Contractor's registration number, the number of workers in each trade classification, and the applicable wage rate for each trade listed. The Contractor agrees to provide each Subcontractor of any tier with a schedule of applicable prevailing wage rates. The Contractor and the respective Subcontractors of any tier shall pay all fees required by the Department of Labor and Industries, including fees for the approval of the "Statement of Intent to Pay Prevailing Wages." Approved copies of the "Statement of Intent to Pay Prevailing Wages" must be posted where workers can easily read them.

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§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, and it has been approved by the Owner, the Owner shall make payment in the manner and within the time provided in the Contract ~~Documents, and shall so notify the Architect.~~Documents. The Owner will make a progress payment within thirty days of its receipt and approval of the Architect's Certificate for Payment. The Owner shall be entitled to withhold payment to the extent provided by the Contract Documents, notwithstanding the issuance of a Certificate for Payment.

§ 9.6.2 The Contractor shall pay each Subcontractor, out of the amount paid to the Contractor on account of such Subcontractor's portion of the Work, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner. If the Contractor does not receive payment for any cause which is not the fault of a particular Subcontractor but does receive payment for materials supplied or Work performed by that Subcontractor, the Contractor shall pay that Subcontractor in accordance with its subcontract for its satisfactorily completed Work, less the retained percentage.

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

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

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

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

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

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

§ 9.7 Failure of Payment

If the Architect ~~does not~~ improperly fails to issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's timely, complete and approved Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount ~~certified by the Architect or awarded by binding dispute resolution,~~ due and owing to the Contractor, then the Contractor may, upon seven additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. This right to stop Work does not apply in the case of the failure to issue a Certificate of Payment for amounts in dispute. The Contract Time shall be extended appropriately and the Contract Sum shall be

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increased by the amount of the Contractor's reasonable costs of shutdown, delay and ~~start-up,~~ start-up as provided for in Section 7.5 of these General Conditions, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof designated and approved by the Owner is sufficiently complete in accordance with the Contract Documents so that the Owner can ~~occupy or utilize the Work for its intended use.~~fully occupy or utilize the Work or the designated portion thereof for its intended use, including FF&E and student, teacher, and staff occupancy. The fact that the Owner may occupy the Work or a designated portion thereof does not indicate that the Work is acceptable in whole or in part. All Work other than incidental corrective or punch list Work and final cleaning shall be completed, including but not limited to the following:

(1) Obtain applicable occupancy permits, including any fire/life safety systems and health department approval, pressure vessel permits, elevator permits, and similar approvals or certificates by governing authorities and franchised services, assuring the Owner's full access and use of completed Work.
(2) Submit the Contractor's punch list of items to be completed or corrected and written request for inspection.
(3) Complete final start-up, testing, and commence instruction and training sessions on all major building systems including HVAC and controls, intercom, data communications, fire alarm, telephone, fire sprinkler, security, clocks, and establish a Date of Commissioning.
(4) Make final changeover of locks and transmit new keys to the Owner, and advise the Owner of the changeover in security provisions.
(5) Discontinue or change over and remove unnecessary temporary facilities and services from the project site.
(6) Advise the Owner on coordination of shifting insurance coverages, including proof of extended coverages as required.
(7) Complete final cleaning.

The Work is not Substantially Complete unless the Architect reasonably judges that the Work can achieve Final Completion within sixty days (or such other period of time as is specified in the Contract Documents), appropriate cleaning has occurred, all designated systems and parts are commissioned and usable, including balancing of the HVAC system, utilities are connected and operating normally and training sessions have occurred, all required temporary occupancy permits, pressure vessel permits, elevator permits, and similar approvals or certificates by governing authorities and franchised services, assuring the Owner's full access to the Work have been issued, O&M manuals have been submitted for review, and the Work is accessible by normal vehicular and pedestrian traffic routes. The fact that the Owner may occupy the Work or a designated portion thereof does not indicate that the Work is Substantially Complete or is acceptable in whole or in part, nor does such occupation toll or change any liquidated damages due the Owner.

§ 9.8.1.1 Date of Commissioning of Operational Systems. The systems of the Work so designated in the Contract Documents are considered "Operational Systems." Unless otherwise specified in the Contract Documents, the Operational Systems include the HVAC system, the data communications system(s), the intercom system, the life safety system(s), the clock system, the telephone system, and the security system. When the Contractor considers that the Operational Systems are complete and fully functional, up and running and ready for normal operation and any functional performance testing as specified for each phase, and after all pre-commissioning checklists have been completed, the Contractor shall so notify the Architect and the Owner in writing a minimum of thirty days prior to the Date of Substantial Completion for that portion or phase as fixed in the Contract Documents. The Architect or the Owner's Commissioning Agent will then schedule a pre-commissioning inspection and observe the functional performance tests of these systems identified in the Contract Documents to determine whether the Operational Systems are complete and ready for normal operation. If the inspection discloses that the Operational Systems are not Substantially Complete or that any item is not in accordance with the requirements of the Contract Documents, the Contractor shall expeditiously, and before the Date of Commissioning, complete or correct such item upon notification by the Architect or the Owner's Commissioning Agent. The Contractor shall then submit a request for another inspection to determine completion of the Operational Systems and pay the costs associated with the reinspection, including fees of any commissioning agent and the Architect and its consultants. When the Operational Systems are complete, the Architect or the Owner's Commissioning Agent will notify the Owner in writing, which shall establish the Date of Commissioning. Training of Owner personnel shall not begin until the Date of Commissioning and shall be conducted prior to departure of the installing entity from the site by appropriate

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Subcontractor personnel who are knowledgeable with the construction and operation of each system. Warranties on the Operational Systems required by the Contract Documents shall commence on the Date of Commissioning for the entire Project, unless otherwise provided, but the Contractor shall retain the responsibility to maintain the systems until Final Acceptance. The Date of Commissioning shall not have an effect on the duties of the parties at Substantial Completion.

§ 9.8.1.2 Indemnification. The Contractor shall defend, indemnify, and hold harmless the Owner and the Architect and their agents, employees, and consultants, successors and assigns from and against all claims, damages, losses and expenses of third parties, direct and indirect, or consequential, including costs, design professional fees, and attorneys' fees incurred by the Owner related to such claims and in proving the right to indemnification, arising out of or resulting from the failure of the Contractor to attain the Date of Commissioning less than thirty days prior to the Date of Substantial Completion fixed by the Contract Documents. In particular, the Contractor acknowledges that a 30-day period after the Date of Commissioning and prior to occupancy is specified during which all HVAC, mechanical, electrical, control and environmental management systems are fully operational under procedures and loads intended to provide unoccupied space with positive performance for pre-occupancy environmental documentation, and the systems are scheduled to operate under a procedure intended to dissipate out-gassing that may occur from interior and other materials.

§ 9.8.1.3 Beginning ninety days before the scheduled date of Substantial Completion, the Contractor shall prepare reports weekly, identifying items to be completed in order to obtain required certificates of occupancy and make recommendations to the Owner with respect to effectuating the earliest possible completion. The Contractor shall include this report as a schedule item on its CPM schedule.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Owner and the Architect a comprehensive list of items to be completed or corrected prior to final payment. The Contractor shall proceed promptly to complete and correct items on the list. The Contractor shall immediately clean-up any dust or debris created through punchlist Work activities. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, and upon verification by the Architect that all permits, approvals, testing, training and other submittals and administrative actions required under the Contract Documents for obtaining Substantial Completion have been satisfied, the Architect and, at its option, the Owner will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion. If the Owner or Architect determines that the Work or designated portion is not substantially complete, the Contractor shall expeditiously complete the Work or designated portion, and again request an inspection. The Contractor shall pay the costs associated with this third and any further reinspections.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that upon approval of the Owner shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion. The Contractor shall attach and submit with the executed Certificate of Substantial Completion, the Certificate of Occupancy, as well as a written list of each outstanding and unresolved Claim; any Claim not so submitted and identified, other than retainage and the undisputed balance of the Contract Sum, shall be deemed waived and abandoned. If the Owner or Architect determines that the Work or designated portion is not Substantially Complete, the Contractor shall expeditiously complete the Work or designated portion, again request an inspection, and pay the costs associated with the re-inspection, including Architect and consultant fees.

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§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. ~~Upon such acceptance,~~ Any items not included by the Architect but required or necessary for Final Completion of the Contract shall be supplied and installed by the Contractor as a part of the Contract Sum, notwithstanding their not being recorded by the Architect. Upon such written acceptance of the Certificate of Substantial Completion by the Owner and the Contractor, and upon the Contractor's Application for Payment, and consent of surety if any, the Owner shall make payment ~~of retainage applying to the Work or designated portion thereof.~~ as provided in the Contract Documents. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents. No further payment will be due or owing until the payment following Final Completion.

§ 9.8.6 The Contractor shall prepare, continue to monitor with the Architect, and cause to be completed, all punchlists with respect to the activity of each Subcontractor and report weekly to the Owner on all outstanding uncompleted items.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may upon written notice to the Contractor take possession of, operate, occupy or use any completed or partially completed portion of the Work at any ~~stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project.~~ stage. Such partial occupancy or use may commence whether or not the portion is substantially ~~complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents.~~ complete. Unless otherwise agreed in writing, such possession, use or operation shall not be deemed an acceptance of any portion of the Work, nor accelerate the time for any payment to the Contractor under the Contract, nor prejudice any rights of the Owner under the Contract or under any insurance, bond, guaranty or other requirement of the Contract, nor relieve the Contractor of the risk of loss or any of its obligations under the Contract, nor establish a Date of Substantial or Final Completion, nor establish a date for termination or partial termination of the running of liquidated damages, nor constitute a waiver of any Owner claims. If the Contractor fails to achieve Substantial Completion of the Work or designated portion thereof within the Contract Time, or fails to achieve Final Completion of the Work within sixty days of Substantial Completion (or such other period of time as is specified in the Contract Documents), the Owner may take possession of, use or operate all or any part of the Work without an increase in the Contract Sum or the Contract Time on account of such possession or use. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. ~~The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.~~

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

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

§ 9.10 Final Completion and Final Payment

§ 9.10.1 The Contractor shall cause punch list items to be completed within sixty days of Substantial Completion of each phase (or such other period of time as is specified in the Contract Documents) or within such reasonable period as may be required to correct the item (in the event that the punch list items are, because of their nature, incapable of correction during that period) provided that the Contractor commences to correct the item within that period and thereafter diligently and in good faith pursues the corrective action to completion. If, at forty-five days after the Date of Substantial Completion, the Owner considers that the punch list items are unlikely to be completed within the next fifteen days, the Owner may, upon seven days' written notice to the Contractor, take over and perform some or all of the punch list items. If the Contractor fails to make reasonable progress towards the correction of the deficiencies within this seven day period, the Owner may deduct from the Contract Sum the actual cost of performing this punch list Work, including any design costs, plus 15% to account for the Owner's transaction costs. Upon receipt of the Contractor's notice that the Work is ready for final inspection and ~~acceptance and upon receipt of a final Application for Payment,~~ acceptance, the Architect will promptly make such ~~inspection. When the Architect finds~~ inspection accompanied by the Contractor (if requested by the Architect or Owner). If the Architect or Owner determines that

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some or all of the punch list items are not accomplished, the Contractor shall be responsible to the Owner for all costs, including re-inspection fees, for any subsequent Architect's inspection to determine compliance with the punch list. When the Architect finds all punch list items complete and the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly ~~issue a final Certificate for Payment~~ notify the Owner and the Contractor in writing stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract ~~Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable.~~ Documents. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.1.1 The Contractor is liable for, and the Owner may deduct from any amounts due the Contractor, all Architect, engineer or other design consultant fees and all Commissioning Agent and Project Manager fees incurred by the Owner for services performed more than sixty days after Substantial Completion of all the Work (or such other period of time as is specified in the Contract Documents), whether or not those services would have been performed prior to that date had Final Completion been achieved in a timely manner.

§ 9.10.1.2 When the Architect finds that the Work has been concluded, a final occupancy permit has been issued, any commissioning process and validation process have been successfully concluded, and the Contractor has submitted all the items identified in the Contract Documents as required for Final Completion to the Architect, the Contractor may submit a final Application for Payment. The Architect will then promptly issue a final Certificate for Payment stating that the entire balance found to be due the Contractor and noted in said final Certificate is due and payable. The Architect's final Certificate for Payment shall establish the date of Final Completion upon its execution by the Owner.

§ 9.10.1.3 "Final Completion" will be attained when the Contractor has accomplished the following:

(1) Complete all requirements listed in Section 9.8 for Substantial Completion.
(2) Complete all remaining punch list items and remaining Work, and obtain approval by Architect and Owner that all Work is complete.
(3) Obtain permanent occupancy permits (if only a temporary occupancy permit was issued at Substantial Completion).
(4) Submit final change order and final Application for Payment.
(5) Submit record documents, any final property survey, and paper and electronic operation and maintenance manuals required by the Contract Documents.
(6) Deliver tools, spare parts, extra stock of material and similar physical items to the Owner as required by the Contract Documents.
(7) Complete final cleaning after punchlist Work (in addition to the final cleaning that was required to obtain Substantial Completion).
(8) Complete instruction and training sessions on all major building systems including HVAC, intercom, data communications, fire alarm, telephone, fire sprinkler, emergency power, security and clocks.
(9) Submit executed warranties.
(10) Discontinue or change over and remove temporary facilities and services from the project site.
(11) Advise the Owner on coordination of shifting insurance coverages, including proof of extended coverages as required.
(12) All copies of Instruments of Service, except the Contractor's record set, have been returned to the Owner or are suitably accounted for to the Owner.

§ 9.10.2 Neither final payment nor any ~~remaining~~ retained percentage shall become due until ~~the Contractor submits to~~ after the Owner's Board of Directors has formally accepted the Project ("Final Acceptance"). To achieve Final Acceptance, the Architect must have issued a final Certificate for Payment under Section 9.10.1.2, an occupancy permit must have been issued, Final Completion must have occurred, and the Contractor must have submitted to the Owner and the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, except for any claims that are specifically identified on the affidavit (Affidavit of Payment of Debts and Claims, AIA form G706 or equivalent), (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (AIA form G707 or equivalent) (5) documentation of any and all special warranties, such as manufacturers' warranties or specific

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Subcontractor warranties, ~~and~~ (6) ~~if required by the Owner,~~ other data establishing payment or satisfaction of or protection against obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated ~~by the Owner.~~ by the Owner (Contractor's Affidavit of Release of Liens, AIA form G706A or equivalent), (7) pursuant to RCW 39.12.040, an "Affidavit of Wages Paid" from the Contractor and from each Subcontractor of any tier certified by the Industrial Statistician of the Washington State Department of Labor and Industries, with the fees paid by the Contractor or Subcontractor, (8) a letter from the Architect indicating that the Work is complete and recommending Final Acceptance of the Project by the Owner, (9) certification that the materials in the Work are "lead-free" and "asbestos-free," (10) a certified statement that the Contractor has closed all necessary permits or otherwise met the requirements of all governing jurisdictions related to this project, including but not limited to all city or county departments, health districts and utility districts, provided to Owner with a copy of all closed or signed off permits, (11) record documents, (12) all guarantees, training, manuals, operation instructions, certificates, spare parts, maintenance manuals and stock, specified excess material, as-built drawings and other documents, training or items required by the Contract Documents or local governmental entities, and (13) all submittals and information sufficient for the Owner to submit apprenticeship utilization data as required by RCW 39.04.320(5)(a). Pursuant to RCW 60.28, "Lien for Labor, Materials, Taxes on Public Works," completion of the Contract Work shall occur upon Final Acceptance. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

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

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

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

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

§ 9.10.6 Release of Retainage. The retainage will be held and applied by the Owner as a trust fund in a manner required by RCW 60.28. Release of the retainage will be processed in ordinary course of business upon the expiration of sixty days following Final Acceptance of the Work by the Owner provided that no notice of lien shall have been given as provided in RCW 60.28, that no claims have been brought to the attention of the Owner and that the Owner has no claims under this Contract; and provided further that, for state-funded projects, release of retention has been duly authorized by the State. The following items must also be obtained prior to release of retainage: pursuant to RCW 60.28, a certificate from the Department of Revenue; pursuant to RCW 50.24, a certificate from the Department of Employment Security; and appropriate information from the Department of Labor and Industries.

§ 9.10.7 The execution of a Change Order shall constitute a waiver of Claims by the Contractor arising out of the Work to be performed or deleted pursuant to the Change Order, except as specifically described in the Change Order. Reservations of rights will be deemed waived and are void unless the reserved rights are specifically described in detail to the satisfaction of the Owner and are initialed by the Owner.

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§ 9.10.8 If a Subcontractor of any tier refuses to furnish a release or waiver required by the Owner, the Owner may (a) retain in the fund, account, or escrow funds in such amount as to defray the cost of foreclosing the liens of such claims and to pay attorneys' fees, the total of which shall be no less than 150% of the claimed amount, or (b) accept a bond from the Contractor, satisfactory to the Owner, to indemnify the Owner against such lien. If any such lien remains unsatisfied after all payments from the retainage are made, the Contractor shall refund to the Owner all moneys that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.9 The Contractor and all Subcontractors of any tier shall maintain books, ledgers, records, documents, estimates, bids, correspondence, logs, schedules, emails, facsimiles, and other tangible and electronic data and other evidence relating or pertaining to the costs and/or performance of the Contract ("records") to such extent and in such detail as will properly reflect and fully support compliance with the requirements of the Contract Documents and with all costs, charges and other amounts of whatever nature. The Contractor shall preserve such records for a period of three years following the date of Final Acceptance under the Contract and for such longer period as may be required by any other provision of the Contract. Within seven days of the Owner's request, the Contractor agrees to make available at the office of the Contractor during normal business hours all records for inspection, audit and reproduction (including electronic reproduction) by the Owner or its representatives. These requirements shall also be applicable to each Subcontractor of any tier and included in each Subcontract and purchase order issued with respect to the Work, except fixed-price Subcontracts where the price is $25,000 or less. The Contractor agrees, on behalf of itself and Subcontractors of any tier, that any rights under RCW 42.56 will commence at Final Acceptance, and that the invocation of such rights at any time by the Contractor or a Subcontractor of any tier, or their respective representatives, shall initiate an equivalent right to disclosures from the Contractor and Subcontractors of any tier for the benefit of the Owner. Failure to fully comply with any requirements of this Section shall constitute a material breach of contract and shall constitute a waiver of all claims by the Contractor and any Subcontractor that does not fully comply.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall have the right to control and shall be solely and completely responsible for conditions of the Work site, including safety of all persons and property, during performance of the Work. The Contractor shall maintain the Work site and perform the Work in a manner that meets statutory and common-law requirements for the provision of a safe place to work. This requirement shall apply continuously and not be limited to working hours. Any review by the Owner, Project Manager, Owner's Representative, or the Architect of the Contractor's performance shall not be construed to include a review of the adequacy of the Contractor's safety measures in, on or near the site of the Work. No action or inaction of the Architect, Project Manager, Owner's Representative, or Owner relating to safety, property protection, any element of the Contractor's Safety Manual or related performance, or violation thereof shall in any way: (1) relieve the Contractor of sole and complete responsibility for the violation and the correction thereof, or of sole liability for the consequences of said violation; (2) impose any obligation upon the Owner, Project Manager, or Architect to inspect or review the Contractor's safety program or precautions or to enforce the Contractor's compliance with the requirements of this Article 10; (3) impose any continuing obligation upon the Owner, Project Manager, or Architect to ensure the Contractor performs the Work safely or to provide such notice to the Contractor or any other person or entity; (4) affect the Contractor's sole and complete responsibility for performing the Work safely or the Contractor's responsibility for the safety and welfare of its employees and the employees of Subcontractors of any tier; or (5) affect the Contractor's responsibility for the protection of property, students, staff and the general public.

§ 10.2 Safety of Persons and Property

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

- **.1** employees on or involved in the Work and other persons who may be affected thereby;
- **.2** the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and
- **.3** other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

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§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss. The Contractor shall comply with all notices and comply with all requests from the Owner regarding the safety and protection of the Owner's students and staff. The Contractor shall comply with the safety regulations set forth in "Safety Standards for Construction" and "General Safety Standards" and any other requirements published by the Washington State Department of Labor and Industries. The Contractor shall comply with the Federal Occupational Safety and Health Act of 1970 (OSHA), including all revisions, amendments and regulations issued thereunder, and the provisions of the Washington Industrial Safety and Health Act of 1973 (WISHA), including all revisions, amendments and regulations issued thereunder by the Washington State Department of Labor and Industries. The WISHA regulations shall apply to all excavation, trenching and ditching operations. In case of conflict between any such requirements, the more stringent applicable regulation or requirement shall apply.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards. The Contractor shall maintain at the work site office or other well-known place at the work site all materials (e.g., a first aid kit) necessary for giving first aid to the injured, and shall establish, publish and make known to all employees procedures for ensuring immediate removal to a hospital or a doctor's care, persons, including employees, who may have been injured on the site. Employees shall not be permitted to work on the site before the Contractor has established and made known procedures for removal of injured persons to a hospital or a doctor's care. The Contractor and/or any Subcontractors shall ensure that at least one of such employees has a valid, effective first aid card.

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

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

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

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

§ 10.2.8 Injury or Damage to Person or Property
If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter. This Section does not apply to Claims, damages for additional costs or time, acceleration, or delay.

§ 10.2.9 At all times until the Owner's occupancy of the Work or a designated portion of the Work, the Contractor shall protect from damage, weather, deterioration, theft, vandalism and malicious mischief and shall bear the risk of any uninsured loss or destruction of, or injury or damage to, all materials, equipment, tools, and other items incorporated or to be incorporated in the Work or designated portion, or consumed or used in the performance of the Work or

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designated portion, and all Work in process and completed Work or designated portion. The Contractor is responsible for any deductible amounts related to any insurance coverage.

§ 10.2.10 Any notice given to the Contractor by the Owner or the Architect of a safety or property protection violation will not: (1) relieve the Contractor of sole and complete responsibility for the violation and the correction thereof, or for sole liability for the consequences of said violation; (2) impose any obligation upon the Owner or Architect to inspect or review the Contractor's safety program or precautions or to enforce the Contractor's compliance with the requirements of this Article 10; or (3) impose any continuing obligation upon the Owner or Architect to provide such notice to the Contractor or any other persons or entity.

§ 10.3 Hazardous Materials and Substances

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

§ 10.3.2 Upon receipt of the Contractor's notice, and with the Owner's agreement, the Owner shall obtain the services of a licensed laboratory to reasonably verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to ~~cause it to be~~ verify that it has been rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable ~~objection.~~ objection, but the Owner shall not be responsible for any delay resulting from the Contractor's objection to such person or entity. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time ~~shall~~ may be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's demonstrated and reasonable additional costs of shutdown, delay, and ~~start-up.~~start-up, which adjustments shall be accomplished as provided in Articles 7, 8 and 15 herein.

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

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances. The Contractor shall store all hazardous materials safely, whether or not required by Contract Documents. The Contractor shall not install hazardous materials, including without limitation asbestos, lead, mercury, or polychlorinated biphenyl (PCB), in the Work.

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

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

§ 10.4 Emergencies

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

§ 10.5 PUBLIC SAFETY AND CONVENIENCE

§ 10.5.1 The Contractor shall conduct its Work so as to ensure the least possible obstruction to vehicular traffic and inconvenience to the general public and others in the vicinity of the Work and to ensure the protection of persons, property and natural resources. No road or street shall be closed to the public except with the permission of the Owner and the proper governmental authority. Fire hydrants on or adjacent to the Work shall be accessible to firefighting equipment at all times. Temporary provisions shall be made by the Contractor to ensure the use of sidewalks, fire lanes, private and public driveways and proper functioning of gutters, sewer inlets, drainage ditches and culverts, irrigation ditches and natural water courses, if any, on the Work site.

§ 10.6 WEATHER PROTECTION

§ 10.6.1 Temporary weather protection of the Work is the responsibility of the Contractor as necessary to proceed in accordance with the Contractor's schedule and environmental conditions. Weather protection shall include but not be limited to protection of soils, subgrade preparation, exterior concrete, masonry, sealant, gypsum sheathing, roofing, and interior finishes. Delays and costs resulting from the Contractor's failure to protect the Work from damage due to weather are the sole responsibility of the Contractor.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized and admitted to issue insurance in the jurisdiction where the Project is located. The Owner, ~~Architect, and Architect's consultants~~ its directors, officers, and agents, the Architect, their respective consultants and employees, and any required governmental agencies and others designated in the Contract Documents shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract ~~Documents.~~Documents and shall include a severability of interest (cross liability clause) for Work performed under this Contract. The insurer shall possess an A.M. Best's policyholder's rating of A- or better and a financial rating of no less than VIII and shall be reasonably acceptable to the Owner. The insurance shall include at a minimum an occurrence-based Commercial General Liability Insurance Policy, which shall provide personal injury, bodily injury and property damage liability; advertising injury; automobile liability insurance policy, including but not limited to owned, non-owned and hired vehicles; on Work the Contractor may subcontract or sublet to others; and on the indemnity provisions of this Contract, including but not limited to premises, products/completed operations, personal injury, blanket contractual liability, explosion, collapse or underground (XCU), employment related practices coverage, and stopgap employer's liability. The Contractor's policy shall be designated primary coverage for both defense and indemnity, and any Owner's policies excess. Such limits of liability insurance shall have per project general aggregate provisions and shall not be less than the following:

- **.1** Commercial General Liability, Bodily Injury and Property Damage Liability, including Premises and Operations, Independent Contractors, Protective Liability, Completed Operations and Products, Contractual in the amount of $1,000,000 per occurrence with a per-project general aggregate limit of at least $2,000,000;
- **.2** Commercial Auto Liability, Bodily Injury and Property Damage, in an amount of at least $1,000,000 Combined Single Limit;
- **.3** $1,000,000 for claims involving blanket contractual liability insurance (included and defined in the Commercial General Liability Insurance Policy) applicable to the Contractor's obligations under Section 3.18; and

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.4 In addition, the Contractor shall maintain an umbrella policy that provides excess limits following form over the primary layer, in an amount not less than $8,000,000.

§ 11.1.1.1 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. If existing policy(s) provide higher limits than those specified herein, the higher limits shall be applicable and the certificates should reflect those higher limits. Coverages shall be written on an occurrence basis, shall be maintained without interruption from the date of commencement of the Work until the date of Final Acceptance and termination of any coverage required to be maintained after final payment. Completed operations coverage shall remain in force for six years after Final Acceptance. The insurance described above shall include coverage for underground, collapse and explosion exposures. In addition, the Contractor shall purchase and maintain insurance for claims under workers' compensation (industrial insurance), disability benefit and other similar employee benefit acts in the State statutory amount and Employer's Liability Insurance (Stop Gap) with limits of at least $1,000,000 each accident; $1,000,000 disease each employee; and $1,000,000 disease policy limit. Losses up to the deductible amount shall be the responsibility of the Contractor.

§ 11.1.1.2 Before any presence on site, commencing Work or exposure to loss can occur, or, in any event, within ten days after the Owner has issued its Conditional Notice to Proceed, the Contractor shall furnish the Owner with four copies of Certificates of Insurance on AIA Document G705 or ACORD Certificate of Liability Insurance as evidence of all insurance required by the Contract Documents, including an endorsement to the insurance policies naming the Owner, its directors, officers, and agents, the Architect, their consultants and employees, any required governmental agencies and others designated in the Contract Documents as additional insureds using form CG 20 10 11/85 or its equivalent. If the Agreement is executed, no Progress Payment will be due until all such Certificates are furnished. All policies and certificates must be signed copies and shall contain a provision that coverages afforded under the policies cannot be materially altered (i.e. the coverages reduced, the limits decreased or the additional insured removed) allowed to expire, or cancelled without first giving forty-five days prior written notice by certified mail to the Owner and Architect. The Contractor shall furnish to the Owner and Architect copies of any subsequently issued endorsements amending, modifying, altering or restricting coverage limits. Furthermore, such policies or certificates shall contain a clause verifying that the policy contains coverage for blanket contractual liability including both oral and written contracts and that liability coverages include protection for underground, collapse and explosion and that the indemnification provisions of Section 3.18 are acknowledged. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.1.1. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness. Upon written request, the Contractor will provide a copy of its policies to the Owner. The Owner's specification or approval of the insurance in this Contract or of its coverage or amount shall not relieve or decrease the liability of the Contractor under the Contract Documents or otherwise. Coverages are the minimum to be provided and are not limitations of liability under the Contract, indemnification, or applicable law provisions. The Contractor may, at its expense, purchase larger coverage amounts. Notwithstanding anything herein to the contrary, the Contractor shall provide all bonding, insurance, and permit documentation as required by governmental entities for all portions of the Project.

§ 11.1.1.3 The Contractor shall ensure and require that Subcontractors of any tier have insurance coverage to cover bodily injury and property damage on all operations and all vehicles owned or operated by Subcontractors of all tiers in the minimum amount of $1,000,000 per occurrence with a $2,000,000 general aggregate limit. Also, the Subcontractors shall name the Contractor and the Owner and cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, its directors, officers, and agents, the Architect and the Architect's consultants as additional insureds for claims arising out of or caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner, its directors, officers, and agents, as an additional insured for claims arising out of or caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.1.1.4 If the Owner is damaged by the failure of the Contractor to maintain any of the insurance in this Article 11 or to so notify the Owner, then the Contractor shall bear all costs attributable thereto. The Owner may withhold payment pending receipt of all certificates of insurance. Failure to withhold payment shall not constitute a waiver.

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§ 11.1.1.5 Insurance requirements to operate a drone over the construction site or any other school district property. If Contractor or its Subcontractors of any tier use or operate a drone or unmanned aircraft on or over the construction site or any other property of the Owner, Contractor shall provide to Owner evidence of sufficient insurance such as aircraft liability insurance to cover any damages, including bodily injury or property damage, caused by the operation and use of such drone or unmanned aircraft prior to its use on or above the construction site or any other property of the Owner. If a Subcontractor of any tier is the operator of such a drone or unmanned aircraft, the evidence of such insurance shall be provided by that Subcontractor. The limit of liability shall be at least $1,000,000 each occurrence.

§ 11.1.2 The Contractor shall provide surety bonds covering the faithful performance of the Contract and payment of obligations arising under the Contract Documents, each in the full amount of the Contract Sum plus sales tax, pursuant to RCW 39.08, "Contractor's Bond." All bonds shall be of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located. The surety company shall be acceptable to the Owner, shall have an A.M. Best rating of "A" or better and a financial rating of no less than "IX," and shall be admitted and licensed in the State of Washington. Within ten days after the Owner's issuance of the notice of intent to award the Contract, the Contractor shall deliver evidence of its bondability to the Owner. Within ten days after its execution of the contract, the Contractor shall deliver the originals of the bonds to the Owner and one copy to the Architect. THE OWNER MAY DECLINE TO ENTER INTO THE CONTRACT IF THE REQUESTED EVIDENCE OF BONDABILITY IS NOT RECEIVED. THE CONTRACTOR SHALL NOT PROCEED WITH THE WORK UNTIL SUCH SURETY BONDS ARE RECEIVED AND THE OWNER MAY TERMINATE THE CONTRACT FOR CAUSE. Evidence of bondability shall include the percentage to be paid by the Contractor for increases in the Contract Sum.

§ 11.1.2.1 If the Owner is damaged by the failure of the Contractor to maintain any of the bonds or insurance in this Article 11 or to so notify the Owner, then the Contractor shall bear all costs attributable thereto. The Owner may withhold payment pending receipt of all certificates of insurance and bonds. Failure to withhold payment shall not constitute a waiver.

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

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

§ 11.2 Owner's Insurance

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

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

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~~maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.~~See Section 11.6.

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. ~~Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.~~See Section 11.6.

§ 11.3 Waivers of Subrogation

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

§11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 See Section 11.6.

§ 11.5.2 See Section 11.6.

§ 11.6 PROPERTY INSURANCE

§ ~~11.3.2~~ ~~If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.~~**11.6.1** Unless otherwise provided, the Contractor shall purchase and maintain until the Owner takes occupancy of the entire Project, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form to cover the course of construction upon the entire Work at the site and all materials or equipment furnished or installed by the Owner on the Project, in the amount of the Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project. This insurance shall insure against the perils of fire and extended coverage and physical loss or damage and shall provide "all risk" coverage for the interests of the Owner, the Contractor and Subcontractors as named insured, as their respective interests appear. Upon written request, the Contractor will provide a copy of its policy to the Owner. Each loss may be subject to a deductible of not more than $10,000. Except for losses caused by the Owner or by natural occurrences, losses up to the deductible

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amount or otherwise not covered by insurance shall be paid by the Contractor. For losses caused by the Owner or by natural occurrences, losses up to the deductible amount shall entitle the Contractor to an increase in the Contract Sum for that deductible amount (but only up to $10,000). This insurance shall include as loss payee the Owner, the Contractor and Subcontractors of any tier as named insureds, as their respective interests appear. The policy shall be endorsed to allow complete or partial occupancy by the Owner before or after Substantial Completion without the insurer's approval.

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

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

~~**§11.5 Adjustment and Settlement of Insured Loss**~~

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

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

§ 11.6.2 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

§ 11.6.3 If the Contractor does not purchase such property insurance required by the Contract and with all of the coverages described above, the Contractor shall so inform the Owner in writing. The Owner may then effect insurance that will protect the interests of the Owner in the Work, and by appropriate Change Order the cost thereof shall be charged to the Contractor. If the Owner is damaged by the failure or neglect of the Contractor to purchase or maintain insurance as described herein, then the Contractor shall bear all costs properly attributable thereto.

§ 11.6.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit. All tools and equipment of the Contractor and Subcontractors of any tier not intended as part of the construction or installation of the Work will be the sole responsibility of the Contractor.

§ 11.6.5 Upon the occurrence of a loss insured under the property insurance, the Owner shall participate in and approve the adjustment and settlement of any loss with the insurers. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.6.6 Before an exposure to loss may occur, the Contractor shall file with the Owner a copy of each policy that includes insurance coverages required by this Section 11.6. Each policy shall contain all generally applicable

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conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Owner.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

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

§ 12.1.2 If a portion of the Work has been covered that the ~~Architect~~ Architect, Owner or governmental authority has not specifically requested to examine prior to its being ~~covered, the Architect~~ covered and for which neither the Contract Documents nor governmental laws or regulations required inspection, the Architect, Owner or governmental authority may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

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

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the later of the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under ~~Section 9.9.1,~~ the Contract Documents, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it according to the requirements of this Section 12.2.2 with no increase to the Contract Sum (i.e. at no cost to the Owner) promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. ~~The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.~~ If the Contractor does not promptly in accordance with the provisions of this Section 12.2.2 initiate work to correct the Work designated in the notice, the Owner may proceed to correct the Work, the Owner may without further notice dispose of materials and equipment as it sees fit, and the Contractor will be liable for all associated costs. This obligation shall survive acceptance of the Work under the Contract and termination of the Contract, is in addition to other warranties provided by contract or law, and does not establish a time limit for damages.

- **.1** If, in the Owner's opinion, the nonconforming Work either prevents the use of a portion of the facility and/or immediate response is required to prevent further damage or to restore security to prevent external entrance, and/or is a safety hazard (e.g., break in the waterline, sprinkler system failure, failure of the heating system, inability to close or lock exterior door, etc.), the Contractor shall initiate corrective work on site the same day if the Contractor is notified prior to noon, or by noon the following day if notified after noon, and shall complete corrective action within 48 hours.
- **.2** If, in the Owner's opinion, the nonconforming Work has the potential of becoming a safety hazard, of affecting internal security, or of limiting the use of the facility (e.g., potential loss of heat in a single room, failure of one or more plumbing fixtures, loose carpet seam in corridor, interior door lock not working, etc.), the Contractor shall initiate corrective work on site within two working days and shall complete corrective action within five working days.

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.3 If, in the Owner's opinion, the nonconforming Work does not have an impact on the use of the building, but must be fixed, (e.g., interior door closer broken, window cracked, wall covering seam coming loose, etc.), the Contractor shall initiate corrective work on site within fourteen days and shall complete corrective action within twenty-eight days.

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

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

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

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

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

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced ~~as appropriate and equitable.~~ by the greater of the (1) cost of correction or (2) diminution of value of the Work that is not in accordance with the requirements of the Contract Documents. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the internal law of the place where the Project is located, excluding that jurisdiction's choice of law rules. ~~If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.~~The venue for any litigation shall be in Superior Court in the county in which the project is located.

§ 13.2 Successors and Assigns

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

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

§ 13.2.3 If a majority of the ownership or the control of Contractor is acquired by a third party, and such acquisition reasonably imperils performance or creates a conflict of interest that the Owner, in its sole discretion, cannot reasonably reconcile, then the Owner may terminate this Contract at any time pursuant to Section 14.2, except that the Owner shall give the Contractor thirty days written notice of termination and the opportunity for the Contractor to cure prior to termination.

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§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law. The Contractor's sole remedy for claims, disputes and other matters in question of the Contractor, direct or indirect, arising out of, or relating to, the Contract Documents or breach thereof, except claims which have been waived under the terms of the Contract Documents, however, is the dispute resolution procedure of Article 15.

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

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made at an appropriate time and as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public ~~authorities.~~ authorities having jurisdiction. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to or provided by the Owner, or with the appropriate public authority, and the Owner shall bear all related costs of ~~tests, inspections, and approvals.~~ necessary tests, inspections, and approvals, except that the Contractor will be responsible for any costs of retesting and any extra costs caused by the Contractor. The Contractor shall give the Architect and Owner timely notice of when and where tests and inspections are to be made so that the Architect and Owner may be present for such procedures. The independent testing agency shall prepare the test reports, logs and certificates applicable to the specific inspections and tests and promptly and simultaneously deliver the specified number of copies of them to the designated parties. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

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

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

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

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

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work. The Contractor shall provide the Owner and Architect at least forty-eight hours' notice prior to all tests and inspections.

§ 13.4.7 If the Owner is responsible under the Contract Documents, law or regulation to pay only for an inspection of any inspector, consultant or Architect, the Owner shall be required to pay only for the first actual inspection. If the Contractor arranges for an inspection and an extra cost is incurred because the inspector is required to wait, to leave without inspecting, to perform a partial inspection, to return to complete or reinspect, or otherwise to expend time other than for the primary inspection, the Contractor shall be responsible for all such costs to the extent caused by the Contractor. If the Contractor does not pay the charges for which it is responsible within sixty days of billing, the Owner has the option to pay the charges directly and backcharge the Contractor on the next progress payment for the amount paid plus a 10% handling fee.

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§ 13.4.8 No acceptance by the Owner of any Work shall be construed to result from any inspections, tests or failures to inspect or test by the Owner, the Owner's representatives, the Architect or any other person. No inspection, test, failure to inspect or test, or failure to discover any defect or nonconformity by the Owner, the Owner's representatives, the Architect or any other person shall relieve the Contractor of its responsibility for meeting the requirements of the Contract Documents or impair the Owner's right to reject defective or nonconforming items or right to avail itself of any other remedy to which the Owner may be entitled, notwithstanding the Owner's knowledge of the defect or nonconformity, its substantiality or the ease of its discovery. Entities performing inspections and/or testing do not have the authority to direct the Contractor's means and methods and are not agents or representatives of the Owner or Architect. Inspections which meet the requirements of code shall not override the requirements of the Contract Documents, which may be more stringent.

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest ~~from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.~~as specified in the A101 Agreement.

§ 13.6 WRITTEN NOTICE

Written notice shall be deemed to have been duly served if delivered in person to the designated representative as identified in the A101 Agreement, or to an officer of the corporation for which it was intended if the designated representative no longer works for that party; or if delivered at, or sent by facsimile, email, registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice. The title of such communication must clearly indicate the importance of its contents, such as using the words "notice" or "claim" in the re: line. The date of written notice shall be the earlier of the date of personal delivery, actual receipt by facsimile or email, or three calendar days after the date of postmark.

§ 13.7 STATUTES AND OTHER REQUIREMENTS

The Contractor shall abide by the provisions of all applicable Washington statutes and regulations. Although a number of statutes are referenced in the Contract Documents, these references are not meant to be a complete list and should not be relied upon as such.

§ 13.7.1 Contractor Registration and Related Requirements. Pursuant to RCW 39.06, "Registration, Licensing of Contractors," the Contractor shall be registered and licensed as required by the laws of the State of Washington, including but not limited to RCW 18.27, "Registration of Contractors." The Contractor shall: have a current state unified business identifier number; have industrial insurance coverage for the Contractor's employees working in Washington as required in Title 51 RCW; have an employment security department number as required in Title 50 RCW; have a state excise tax registration number as required in Title 82 RCW, and; not be disqualified from bidding on any public works contract under RCW 39.06.010 (unregistered or unlicensed contractors) or RCW 39.12.065(3) (prevailing wage violations).

§ 13.7.2 Law Against Discrimination. The Contractor shall comply with pertinent statutory provisions relating to public works of RCW 49.60, "Discrimination."

§ 13.7.3 Provisions for Aged and Handicapped Persons. The Contractor shall comply with pertinent statutory provisions relating to public works of RCW 70.92, "Provisions in Buildings for Aged and Handicapped Persons," and the Americans with Disabilities Act.

§ 13.7.4 Safety Standards. The Contractor shall comply with pertinent provisions of RCW 49.17, "Washington Industrial Safety and Health Act," and Chapter 296-155 WAC, "Safety Standards for Construction Work."

§ 13.7.5 Unemployment Compensation. Pursuant to RCW 50.24, "Contributions by Employers," in general and RCW 50.24.130 in particular, the Contractor shall pay contributions for wages for personal services performed under this Contract or arrange for a bond acceptable to the commissioner.

§ 13.7.6 Drug-Free Workplace. The Contractor and all Subcontractors of any tier shall fully comply with all applicable federal, state, and local laws and regulations regarding drug-free workplace, including the Drug-Free Workplace Act

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of 1988. Any person not fit for duty for any reason, including the use of alcohol, controlled substances, or drugs, shall immediately be removed from the Work.

§ 13.7.7 Tobacco-Free Environment. Pursuant to RCW 28A.210.310, smoking or use of any kind of lighted pipe, cigar, cigarette, vaping or any other lighted smoking equipment, material or smokeless tobacco products is prohibited on all school district property.

§ 13.7.8 Weapons-Free Environment. The Contractor and its employees, agents, and Subcontractors of any tier shall not bring onto the Project site or onto any Owner property any firearm or any other type of weapon described in either RCW 9.41.280(1) or RCW 9.41.250. Any person violating this Section shall immediately be removed from the Work, and such a violation shall be grounds for a termination of this Agreement for cause at the Owner's discretion.

§ 13.7.9 Asbestos Removal. To the extent this Project involves asbestos removal, the Contractor shall comply with Chapter 49.26 RCW, "Health and Safety--Asbestos," and any provisions of the Washington Administrative Code promulgated thereunder, and the applicable section of the Specifications should be viewed for possible insurance required for the applicable Subcontractor.

§ 13.7.10 Security. All contractors, suppliers, and visitors who come onto the site shall be required to display an identification badge on their person. The Contractor shall be required to administer the distribution of badges and maintain a sign-out log. All badges are to display the signature of the Project Superintendent. All Owner-supplied badges shall be returned before retainage is released.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 ~~The~~ Except as provided by RCW 60.28.080, the Contractor may terminate the Contract if the Work is stopped for a period of ~~30 consecutive~~ sixty consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

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

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

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' ~~notice to the Owner and Architect,~~ written notice to the Owner and Architect (during which period the Owner has the opportunity to cure), terminate the Contract and recover from the Owner payment for Work ~~executed,~~ properly executed for proven loss with respect to materials, equipment, tools, and construction equipment and machinery caused by such termination, as well as reasonable overhead and profit on ~~Work not~~ the Work properly executed, and direct costs incurred by reason of such termination. The total recovery of the Contractor shall not exceed the unpaid balance of the Contract Sum.

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

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opportunity to cure), terminate the Contract and recover from the Owner as provided in Section 14.1.3. The total recovery of the Contractor shall not exceed the unpaid balance of the Contract Sum.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may upon seven days' written notice to the Contractor terminate (without prejudice to any right or remedy of the Owner) the whole or any portion of the Work or the Contract if the Contractor

.1 ~~repeatedly~~ refuses or fails to supply enough properly skilled workers or proper materials;

.2 fails to make prompt payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;

.3 ~~repeatedly disregards~~ fails to comply with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public ~~authority;~~ authority having jurisdiction;

.4 fails to prosecute the Work or any portion thereof with sufficient diligence to ensure the Substantial Completion of the Work within the Contract Time;

.5 is adjudged bankrupt, makes a general assignment for the benefit of its creditors, or if a receiver is appointed on account of its insolvency;

.6 fails to comply with the provisions of RCW 28A.400.330 by permitting a worker on the Project having contact with children who has been convicted of or pled guilty to a felony crime involving children as described in Section 3.4.3; or

~~**.4**~~ **.7** otherwise is guilty of a material or substantial breach of or default under a provision of the Contract Documents.

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

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 Accept assignment of subcontracts pursuant to Section 5.4; ~~and~~

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing ~~the Work.~~ the Work; and

.4 Take or direct any or all of the actions in Section 14.5.1.

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

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall ~~be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.~~ survive termination of the Contract.

§ 14.2.5 If the Owner terminates a portion of the Work, the Contractor shall continue the performance of the remainder of the Work in accordance with the Contract Documents to the extent not terminated.

§ 14.2.6 If, after the Contractor has been terminated pursuant to this Section 14.2 or otherwise for cause, it is determined that none of the circumstances set forth in Section 14.2.1 exists, then such termination shall be considered a termination for convenience pursuant to Section 14.4.

§ 14.3 Suspension by the Owner for Convenience

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

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

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.1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate (without prejudice to any right or remedy of the Owner) the whole or any portion of the Contract for the Owner's convenience and without cause.

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

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor consistent with the Contract Documents for Work properly executed; costs necessarily incurred by reason of the termination, including costs attributable to termination of Subcontracts; ~~and the termination fee, if any, set forth in the Agreement.~~ and reasonable profit on the Work not executed, not to exceed two and a half percent (2.5%) of the Cost of the Work not performed. This amount is less than the Contractor's overhead and profit because the overhead and profit include costs such as bonds and insurance that will not be incurred on the unperformed Work and because the Contractor is not taking on risk for the unperformed Work. The total sum to be paid to the Contractor under this Section 14.4 shall not exceed the Contract Sum as reduced by the amount of payments otherwise made, by the larger of (1) the actual value or (2) the scheduled value of Work not terminated, and as otherwise permitted by this Contract. The amounts payable to the Contractor shall exclude the fair value of property which is destroyed, lost, stolen or damaged so as to become undeliverable to the Owner or to a buyer pursuant to Sections 14.5.1.6 or 14.5.1.7.

§ 14.5 EFFECTS OF TERMINATION BY OWNER

§ 14.5.1 Unless the Owner directs otherwise, after receipt of a Notice of Termination from the Owner pursuant to Section 14.2 or 14.4, the Contractor shall promptly:

.1 stop Work under the Contract on the date and as specified in the Notice of Termination;

.2 place no further orders or subcontracts for materials, equipment, services or facilities, except as may be necessary for completion of any portion of the Work that is not terminated;

.3 procure cancellation of all orders and subcontracts, upon terms acceptable to the Owner, to the extent that they relate to the performance of Work terminated;

.4 assign to the Owner all of the right, title and interest of the Contractor under all orders and subcontracts, as directed by the Owner, in which case the Owner shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts;

.5 with the Owner's approval, settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts not assigned to the Owner;

.6 transfer title and deliver to the entity or entities designated by the Owner the fabricated or unfabricated parts, Work in process, partially completed supplies and equipment, materials, parts, tools, dies, jigs and other fixtures, completed Work, supplies and other material produced as part of, or acquired in connection with the performance of, the Work terminated, and the completed or partially completed plans, drawings, information and other property related to the Work;

.7 use commercially reasonable efforts to sell any property of the types referred to in Section 14.5.1.6. The Contractor shall not be required to extend credit to any buyer, and may acquire any such property under the conditions prescribed by and at a price or prices approved by the Owner, and the proceeds of any such transfer or disposition may be applied in reduction of any payments to be made by the Owner to the Contractor;

.8 take such action as may be necessary or as directed by the Owner to preserve and protect the Work and property related to this Project in the possession of the Contractor in which the Owner has an interest; and

.9 continue performance only to the extent not terminated.

§ 14.5.2 In arriving at any amount due the Contractor after termination, the following deductions shall be made:

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.1 all unliquidated advance or other prior payments on account made to the Contractor applicable to the terminated portion of the Contract;

.2 any claim the Owner may have against the Contractor;

.3 an amount necessary to protect the Owner against outstanding or potential liens or claims; and

.4 the agreed price for or the proceeds of sale of any materials, suppliers or other things acquired by the Contractor or sold, pursuant to the provisions of Section 14.5.1.7, and not otherwise recovered by or credited to the Owner.

§ 14.5.3 If (and only if) the termination pursuant to Section 14.4 is partial, the Contractor may file a Claim for an equitable adjustment of the price or prices specified in the Contract relating to the continued portion of the Contract. Any claim by the Contractor for an equitable adjustment under this Section must be asserted within sixty days from the effective date of the partial Termination.

§ 14.5.4 The Contractor shall refund to the Owner any amounts paid by the Owner to the Contractor in excess of costs reimbursable under the Contract Documents.

§ 14.5.5 The Contractor shall, from the effective Date of Termination until the expiration of three years after final settlement under this Contract, preserve and make available to the Owner, at all reasonable times at the office of the Contractor, and without charge to the Owner, all books, records, documents, photographs and other evidence bearing on the costs and expenses of the Contractor under this Contract and relating to the terminated Work. The Owner may have costs reimbursable under this Article 14 audited and certified by independent certified public accountants selected by the Owner, who shall have full access to all the books and records of the Contractor.

§ 14.5.6 The damages and relief from termination by the Owner specifically provided in Article 14 shall be the Contractor's sole entitlement in the event of termination.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of the Contract terms, payment of money, a change in the Contract Time, or other relief with respect to the terms of the ~~Contract.~~ Contract Documents. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the ~~Contract.~~ Contract Documents. The responsibility to substantiate Claims shall rest with the party making the Claim. Claims must be initiated in writing and include the information and substantiation required by the Contract Documents. Neither a Request for Information, nor a Construction Change Directive, nor a Change Order, nor a reservation of rights, nor minutes of a meeting, nor a Daily Report, nor any log entry, nor an Owner's request for or the Contractor's response to a Change Order proposal or a Proposal Request, nor a notice of a potential or future Claim shall constitute a Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

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

§ 15.1.3 Notice of Claims

§ 15.1.3.1 ~~Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.~~ In an effort to reduce the incidence and costs to all parties of extended disputes, all Claims, direct or indirect, arising out of, or relating to, the Contract Documents or the breach thereof, except claims which have been waived under the terms of the Contract Documents, shall be decided exclusively by the

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following alternative dispute resolution procedure unless the parties mutually agree in writing otherwise. To the extent that the Owner and Contractor agree to any partnering process to help resolve disputes, such processes shall be in addition to, and not in place of, the mandatory dispute resolution procedures in the Contract Documents.

§ 15.1.3.2 ~~Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.~~Except for Claims requiring notice before proceeding with the affected Work as otherwise described in the Contract Documents, the Contractor shall submit a written notice of any Claim to the Owner and the Architect within fourteen days of the occurrence of the event giving rise to such Claim and shall include a clear description of the event leading to or causing the Claim. For all Claims, the Contractor shall submit a written Claim as provided herein within thirty days of submitting the notice. Claims shall include a clear description of the Claim and any proposed change in the Contract Sum (showing all components and calculations) and/or Contract Time (showing cause and analysis of the resultant delay in the critical path and other information referenced in Section 8.3.2) and shall provide data fully supporting the Claim, including without limitation a complete explanation as to why the relief sought is not within the scope of the Contract Documents. The Contractor may delay submitting data by an additional fourteen days if it notifies the Owner in its Claim that substantial data must be assembled. Failure to properly submit the notice or Claim shall constitute waiver of the Claim. The Claim shall be deemed to include all changes, direct and indirect, in cost and in time to which the Contractor (and Subcontractors of any tier) is entitled and may not contain reservations of rights without the Owner's written approval; any such unapproved reservations of rights shall be without effect. Any Claim of a Subcontractor of any tier may be brought only through, and after review by, the Contractor. For the purposes of calculating such time periods, an "event giving rise to a Claim" is not a Request for Information but rather is a response that the Contractor believes would change the Contract Sum and/or Contract Time. The fact that the Owner and the Contractor may consider, discuss or negotiate an untimely or waived Claim shall in no way be deemed to constitute a waiver of any notice or other provisions of the Contract Documents.

§ 15.1.3.3 All notices and Claims shall be made in writing as required by the Contract and shall be addressed to the Owner's Designated Representative identified in the A101. Any notice of a Claim of the Contractor against the Owner and any Claim of the Contractor, whether under the Contract or otherwise, must be made pursuant to and in strict accordance with the applicable provisions of the Contract. No act, omission, or knowledge, actual or constructive, of the Owner or the Architect shall in any way be deemed to be a waiver of the requirement for timely written notice and a timely written Claim unless the Owner and the Contractor sign an explicit, unequivocal written waiver approved by the Owner's Board of Directors. The fact that the Owner and the Contractor may consider, discuss, or negotiate a Claim that has or may have been defective or untimely under the Contract shall not constitute a waiver of the provisions of the Contract Documents unless the Owner and Contractor sign an explicit, unequivocal waiver approved by the Owner's Board of Directors. The Contractor expressly acknowledges and agrees that the Contractor's failure to timely submit required notices and/or timely submit Claims has a substantial impact upon and prejudices the Owner, including but not limited to the inability to fully investigate or verify the Claim, mitigate damages, choose alternative options, adjust the budget, delete or modify the impacted Work, and/or monitor time, cost and quantities. For these and other reasons, the parties stipulate that the Owner is prejudiced by the Contractor's failure to timely submit notices and/or Claims as required by the Contract Documents, and that the Owner shall not be required to establish any actual prejudice in order to enforce the notice and Claim provisions of the Contract Documents.

§ 15.1.3.4 At any time following the Owner's receipt of the written Claim, the Owner may require that an officer of the Contractor, a principal of the Architect, and the Owner's Superintendent or designee (all with authority to settle) meet, confer, and attempt to resolve the Claim. If the Claim is not resolved during such meeting, the Contractor may bring no litigation against the Owner unless the Claim is first subject to nonbinding mediation as described in this Article 15. This mediation requirement cannot be waived except by an explicit written waiver by both parties.

§ 15.1.4 Continuing Contract Performance

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

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§ 15.1.4.2 ~~The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.~~
[Not used.]

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject ~~of the Claim.~~ of the Claim, and a Claim must be made in accordance with this Article 15, or it will be waived. If the Contractor believes additional cost is involved for reasons including but not limited to (1) a written interpretation from the Architect, (2) an order by the Owner to stop the Work where the Contractor was not at fault, (3) a written order for a minor change in the Work issued by the Architect, (4) failure of payment by the Owner, (5) termination of the Contract by the Owner, (6) Owner's suspension or (7) other reasonable grounds, a Claim shall be filed in accordance with this Article 15. The Contractor shall not be entitled to an increase in the Contract Sum or Contract Time arising out of an error or conflict in or among the Contract Documents where the Contractor failed adequately to review the Contract Documents or failed to report the error or conflict to the Owner's Project Manager and Architect in a timely manner consistent with the requirements of the Contract Documents. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided in Section 15.1.3 shall ~~be given.~~ be given, and a Claim must be made in accordance with this Article 15, or it will be waived. The Contractor's Claim shall include an estimate of any cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary. Any adjustment in the Contract Time arising from a Change or a Claim shall be limited to the change in the actual critical path of the Project directly caused thereby. If the delay was not caused by the Owner, the Contractor, a Subcontractor of any tier, or the Architect, or anyone acting on behalf of any of them, the Contractor is entitled only to an increase in the Contract Time in accordance with the Contract Documents but not a change in the Contract Sum. If the delay was caused by the Contractor, a Subcontractor of any tier, or anyone acting on behalf of any of them, the Contractor is not entitled to an increase in the Contract Time or in the Contract Sum.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the scheduled ~~construction.~~construction, and that the Work was on schedule (or not behind schedule through the fault of the Contractor) at the time the adverse weather conditions occurred. Neither the Contract Time nor the Contract Sum will be adjusted for normal inclement weather. The Contractor shall be entitled to a change in the Contract Time only (but not a change in the Contract Sum) if the Contractor can substantiate to the reasonable satisfaction of the Owner and Architect that there was materially greater than normal inclement weather considering the full term of the Contract Time and using a ten-year average of accumulated record mean values from climatological data compiled by the U.S. Department of Commerce National Oceanic and Atmospheric Administration for the locale closest to the Project, and that the alleged abnormal inclement weather actually extended the critical path of the Work. The change in Contract Time shall be provisional until Substantial Completion has been achieved, at which time the change in the Contract Time shall be the extent to which the total net accumulated number of calendar days lost due to inclement weather from commencement of the Work until Substantial Completion exceeds the total net accumulated number to be expected for the same period from the aforesaid data.

§ 15.1.7 Waiver of Claims for Consequential Damages

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes without limitation

- **.1** damages incurred by the Owner for rental expenses, ~~for losses of use,~~ income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- **.2** damages incurred by the Contractor for principal and home office overhead and expenses including without limitation the compensation of personnel stationed there, for losses of financing, business and reputation, for losses on other projects, for interest or financing costs, and for loss of profit, except ~~anticipated profit arising directly from the Work.~~as explicitly allowed under the Contract Documents.

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This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract ~~Documents.~~Documents, or to preclude an obligation of the Contractor to indemnify the Owner for direct, indirect or consequential damages alleged by a third party.

§ 15.2 Initial Decision

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

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

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

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

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

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

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

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

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

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§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in ~~Sections 9.10.4, 9.10.5, and 15.1.7,~~ the Contract Documents, shall be subject to mediation as a condition precedent to the initiation of binding dispute resolution. This requirement cannot be waived except by an explicit written waiver signed by the Owner and the Contractor.

§ 15.3.2 The parties shall endeavor to resolve their Claims by ~~mediation which, unless the parties mutually agree otherwise,~~ mediation. A request for mediation shall be filed in writing with the other party to the Contract, and the parties shall promptly attempt to mutually agree upon a mediator. If the parties have not reached agreement on a mediator within thirty days of the request, either party may file the request with the American Arbitration Association or such other alternative dispute resolution service to which the parties mutually agree, with a copy to the other party, and the mediation shall be administered by the American Arbitration Association (or other agreed service) in accordance with its Construction Industry Mediation Procedures ~~in effect on the date of the Agreement.~~ then in effect. A request for mediation shall be made in ~~writing,~~ writing and delivered to the other party to the ~~Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation~~ Contract. Mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending ~~mediation for a period of 60 days from the date of filing,~~ mediation, unless stayed for a longer period by agreement of the parties or court order. ~~If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.~~

§ 15.3.3 ~~Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.~~
[Not used.]

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

§ 15.3.5 An officer of the Contractor and the Owner's Superintendent or designee must attend the mediation session with authority to settle the Claim. To the extent there are other parties in interest, such as the Architect or Subcontractors, their representatives, also with authority to settle the Claim, shall also attend the mediation session. Unless the Owner and the Contractor mutually agree in writing otherwise, all unresolved Claims shall be considered at a single mediation session that shall occur after Substantial Completion but prior to Final Acceptance by the Owner.

§ 15.4 Arbitration

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

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

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

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

~~**§ 15.4.4 Consolidation or Joinder**~~

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

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

§ 15.5.1 Litigation. Any disputes that are not resolved through negotiations or mediation shall be resolved by litigation and not by arbitration unless mutually agreed in writing otherwise by the Owner's Board of Directors and the Contractor. The Contractor may bring no litigation on Claims unless such Claims have been properly raised and considered in the procedures of this Article 15. The Contractor shall have the burden to demonstrate in any litigation that it has complied with all requirements of this Article 15. All unresolved Claims of the Contractor shall be waived and released unless the Contractor has complied with the time limits of the Contract Documents, and litigation is served and filed within the earlier of (a) 120 days after the Date of Substantial Completion approved in writing by the Owner or (b) ninety days after Final Acceptance. This requirement cannot be waived except by an explicit written waiver signed by the Owner and the Contractor. The pendency of a mediation (the time period between the written mediation request and the date of mediation) shall toll these deadlines until the earlier of the mediator providing written notice to the parties of impasse or thirty days after the date of the mediation session. Neither the Contractor nor a Subcontractor of any tier, whether claiming under a bond or lien statute or otherwise, shall be entitled to attorneys' fees directly or indirectly from the Owner (but may recover attorneys' fees from the bond or statutory retainage fund itself to the extent allowable under law). The Owner may join the Contractor as a party to any litigation or arbitration involving the alleged fault, responsibility, or breach of contract of the Contractor or Subcontractor of any tier.

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

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I, , hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 08:48:14 PT on 10/11/2024 under Order No. 3104238397 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A201™ – 2017, General Conditions of the Contract for Construction,other than changes shown in the attached final document by underscoring added text and striking over deleted text.

_____

(Signed)

_____

(Title)

_____

(Dated)

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SECTION 00 71 00 - SPECIAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

PART 1 - PERMITS, LICENSES AND FEES

1.1 City, County and Other Jurisdictional Authorities

A. The Owner shall secure and pay for all required plan-checking fees, the building permit fee and the L & I electrical permit fee.

B. The Contractor shall obtain and pay for (as part of the Contract Sum and not as an allowance) all additional permits and governmental fees, licenses and inspections necessary for proper execution and completion of the Work which are customarily secured after execution of the Contract and which are legally required when bids are received or negotiations concluded, including without limitation electrical, sewer, water, and plumbing permits and fees. The Contractor shall be responsible for Subcontractor licenses and costs of doing business in the city and county of the Project.

C. The Contractor shall coordinate and schedule all Work with permitting agencies, utility companies, and other such agencies determined to have jurisdictional authority necessary for completion of the Work.

D. The Contractor shall be responsible for providing all information, documents, and fees to the permitting agencies, utility companies, and other such agencies determined to have jurisdictional authority within 30 days after issuance of the Notice to Proceed as necessary to obtain and coordinate permits, utility and other such connections.

1.2 State of Washington Permits

A. The Owner shall secure and pay for all required Department of Labor and Industries plan-checking fees.

1.3 Renewal and Penalties

A. The Contractor shall obtain all permit renewals during the course of the Work.

B. The Contractor will be responsible for any renewals of and penalties arising from the building permit and other permits and governmental fees.

PART 2 - CONTRACTOR'S CONSTRUCTION SCHEDULES

A. The Contractor will be responsible for planning, scheduling, managing and reporting the progress of the work in accordance with all of the specific methods and submittals described in the Contract Documents. Within ten (10) days after award of the Contract, the Contractor shall submit a preliminary schedule of the Work. Within seven (7) days after issuance of the

Notice to Proceed, and before any progress payment need be made, the Contractor, after consultations with its Subcontractors and suppliers of any tier, shall submit six (6) copies of a Contractor's Construction Schedule to the Architect and one copy to the Owner. Not less than ten percent (10%) of the Progress Payment may be withheld until a Contractor's Construction Schedule has been submitted in a form satisfactory to the Architect and Owner. Neither the Owner nor the Architect will review the substance of the Contractor's Construction Schedule.

B. The Contractor's Construction Schedule shall be prepared by a competent scheduler, and used by the Contractor to plan, prosecute, and coordinate the Work in an orderly and expeditious manner. The Contractor's Construction Schedule will be used by the Owner and the Architect to evaluate progress and status at the various stages of the Project, allocate funds, determine the impact of any changes to the Contract, and establish the basis for progress payments. Such review shall not constitute an approval or acceptance of the Contractor's construction means, methods or sequencing, or its ability to complete the Work in a timely manner.

C. The Contractor's Construction Schedule shall be based upon a critical path method ("CPM") analysis of construction activities and sequence of operations needed for the orderly performance and completion of all separable parts of the Work in accordance with the Contract and within the Contract Time. The schedule shall be a CPM type in the form of a precedence diagram and activity listing and shall be time-scaled. It shall include the Notice to Proceed date, the Date(s) of Substantial Completion, and the Date(s) of Final Completion in accordance with the Contract Documents. The Critical Path shall be clearly indicated on the Contractors Construction Schedule. No more than 20% of the progress activities shall be on the critical path, and no more than 30% shall have less than 5 days' float. The value of any one activity shall not exceed $50,000, except that 5% of the total activities may exceed this limit without prior approval. The time-scaled network diagram shall be summarized on a single sheet not to exceed 30" x 42".

1. The network diagram shall show in detail and in order the sequence of all significant activities, their descriptions, start and finish dates, durations and dependencies, necessary to complete all Work and any separable parts thereof. The activity listing shall show the following information for each activity on the network diagram:
    a. Description;
    b. Duration (not to exceed 15 working days);
    c. Craft;
    d. Equipment (including hours of usage);
    e. Start and finish dates;
    f. Total float time and free float time;
    g. Dates that work must be performed and completed by other contractors or subcontractors to support the Work and the interfaces with such other contractors; and
    h. Cost-loading, correlated to the Schedule of Values, which, upon approval, shall be used as a basis for determining action on progress payments throughout the Project.
2. A schedule for the purchase and receipt of items required for performance of the Work, showing lead times between purchase order placement and delivery dates, shall be integrated with the Contractor's Construction Schedule. The Contractor shall furnish the Architect with copies of all purchase orders and acknowledgments and fabrication,

production, and shipping schedules for all major items on the critical path within 10 days of Contractor's receipt of each purchase order, acknowledgment or schedule. Neither the Architect nor the Owner shall be deemed to have approved or accepted any such material, or its schedule, nor deemed to have waived this requirement if some or all of the material is not received.

3. Milestone completion dates shall be clearly defined on the Contractor's Construction Schedule.
4. If abbreviations are used in the Contractor's Construction Schedule, a legend shall be provided to define all abbreviations.
5. The Contractor shall prepare and keep current a schedule of submittals, coordinated with the Contractor's Construction Schedule, which allows the Architect at least 10 days to review the submittals.
6. The Construction Schedules shall be submitted as a paper copy, PDF and in a data format that is capable of being printed using the latest version of Microsoft Project. The Contractor may request to use different project management software, such as Suretrak, but must first receive approval from the Owner, by demonstrating its capabilities. This can be accomplished by submitting a sample CPM printout of similar scope. If the alternative software is accepted, the Contractor will be required to supply the Owner an authorized "Windows" compatible copy of the software with all user support manuals.
7. At each monthly meeting with the Owner, the Contractor shall submit (a) a bar chart schedule showing the activities planned for the next month, and (b) a report showing actual starts and finishes from the previous month. The bar-chart schedule shall show all work activities numbered according to the CPM, any submittal or delivery activities with less than 5 days' float, and any permitting, testing, or inspection activities by others.

D. Within 10 days after receipt by the Architect, two copies of the Contractor's Construction Schedule will be returned to the Contractor with comments, following review by the Owner. Review by the Owner and Architect of the Contractor's Construction Schedule shall not constitute an approval or acceptance of the Contractor's construction means, methods, or sequencing, or its ability to complete the Work in a timely manner.

E. The Contractor shall utilize and comply with the Contractor's Construction Schedule. The Contractor shall not be entitled to any adjustment in the Contract Time, the Contractor's Construction Schedule, or the Contract Sum, or to any additional payment of any sort by reason of the loss or use of any float time, including time between the Contractor's anticipated completion date and end of the Contract Time, whether or not the float time is described as such on the Contractor's Construction Schedule. The Contractor shall not be entitled to any extension of time, compensable or otherwise, for any delay that occurred during any time the Contractor has not timely submitted an updated Construction Schedule as required by the Contract Documents.

F. Should the Contractor fail to meet any scheduled date as shown on the current Contractor's Construction Schedule, the Contractor shall, if requested, be required at its own expense to submit within 10 days of the request an updated Contractor's Construction Schedule. If the Contractor's progress indicates to the Owner that the Work will not be Substantially Completed within the Contract Time, the Contractor shall, at its own expense, increase its work force and/or working hours to bring the actual completion dates of the activities into conformance with the Contractor's Construction Schedule and Substantial Completion within the Contract

Time. The Contractor shall also submit a revised Contractor's Construction Schedule at its own expense within 10 days of notice from the Architect that the sequence of work varies significantly from that shown on the Contractor's Construction Schedule. Neither the Owner nor the Architect will, however, be obligated to review the substance or sequence of the Contractor's Construction Schedule or otherwise determine whether it is correct, appropriate or attainable.

G. Schedule Float Utilization. Any float time to activities not on the critical path shall belong to the Project and may be used by the Project to optimize its construction process. Any float time between the end of the final construction activity and the final completion date shall belong to the Owner and may be used by the Owner in determining if additional contract days are to be awarded for changes in the contract or for delays to the contract caused by the Owner. The Contractor will not be entitled to any adjustment in the Contract Time, the Construction Schedule, or the Contract Sum, or to any additional payment of any sort by reason of the Owner's use of float time between the end of the final construction activity and the final completion date or by reason of the loss or use of any float time, including time between the Contractor's anticipated completion date and end of the Contract Time, whether or not the float time is described as such on the Contractor's Construction Schedule.

PART 3 - INSURANCE

3.1 Insurance Required of the Contractor - The Contractor shall purchase and maintain insurance as set forth in the General Conditions. Such insurance shall be written for not less than the following limits, or greater if required by law

A. Workers' Compensation (industrial insurance) meeting statutory limits mandated by state and federal laws, and Stop Gap Liability Insurance (Employer's Contingent Liability Insurance) with coverage of at least $500,000 each occurrence/each accident.

B. Commercial General Liability, Bodily Injury and Property Damage Liability, including coverage for Premises-Operations, Independent Contractors' Protective, Products-Completed Operations and Products, Contractual Liability, Personal Injury and Broad Form Property Damage (including coverage for Explosion, Collapse and Underground hazards):
   1. At least $1,000,000 Each Occurrence
   2. At least $2,000,000 per project General Aggregate, endorsed to this Project only
   3. The Contractual Liability insurance shall include coverage sufficient to meet the obligations in Section 3.18 of the revised A201-97 General Conditions.

C. Automobile Liability (owned, non-owned and hired vehicles) for bodily injury and property damage with Combined Single Limit of at least $1,000,000 Each Accident.

D. A true umbrella policy which provides excess limits over the primary layer, in an amount not less than $8,000,000.

E. Bodily injury and property damage claims resulting from Mold and Fungus with coverage limits of no less than $1,000,000 each occurrence.

F. The Contractor shall ensure and require that Subcontractors of any tier have insurance coverage to cover bodily injury and property damage on all operations and all vehicles owned or operated by Subcontractors of all tiers in the amount of $1,000,000 per occurrence with a $2,000,000 aggregate limit.

G. The City of Snoqualmie, its elected and/or appointed officials, its officers, employees, agents, volunteers, and representatives are additionally insured insofar as the work, obligations, and activities performed by the owner/developer and authorized by the City of Snoqualmie permit are concerned.

3.2 Not Used

3.3 Property Insurance Required of the Contractor

A. The Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form to cover the course of construction upon the entire Work at the site and all materials or equipment furnished or installed by the Owner on the Project, in the amount of the initial Contract Sum, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles.

B. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project. This insurance shall insure against the perils of fire and extended coverage and physical loss or damage. Each loss may be subject to a deductible. Losses up to the deductible amount or otherwise not covered by insurance shall be the responsibility of the Contractor. This insurance shall include as loss payee the Owner. The policy shall be endorsed to allow complete or partial occupancy by the Owner before or after Substantial Completion without the insurer's approval.

END OF SECTION 00 71 00

SECTION 00 72 00 – SUPPLEMENTAL SPECIAL CONDITIONS OF THE CONTRACT

1. SCOPE OF WORK

A. All work required to construct additions to an older alternative high school to provide a new early childhood center and daycare. Work also includes upgrades to existing structure, site improvements and covered play.

B. The Day Care area will be open for normal school district use, schedules, and activities. The Contractor shall establish and maintain secure separation between construction activities and day care use by staff and the public.

2. SITE VISITS / PRE-BID SITE INSPECTION

A MANDATORY PRE-BID CONFERENCE WILL BE HELD PROMPTLY ON:

Wednesday, November 20, at 2:00-3:00 PM.
(Meet at main office)

Site Address:

TWO RIVERS SCHOOL
330 Ballarat Ave N
North Bend, WA 98045

C. QUESTIONS REGARDING BID

All questions regarding the work shall be directed to SCR Architects / Scott Connor at (206) 228-1014 at least five working days prior to Bid Opening.

3. PROJECT SCHEDULE - Start and Completion

A. Refer to Section 01 11 00 Summary of Work.

4. CONTRACTOR-FURNISHED ITEMS

A. The contractor shall provide all labor, materials, tools, equipment and services required to complete work described herein and shown on the drawings.

5. PERMITS

A. The Snoqualmie Valley School District shall obtain and pay for the City of North Bend Plan Review fee and Building permit for this Project as well as the review fee for the Department of Labor and Industries' electrical plan review. All other permits, licenses, approvals, and other arrangements for work shall be obtained and paid for by the Contractor

6. COMPLIANCE WITH NON-DISCRIMINATION LAWS

A. The Contractor is required to submit to Snoqualmie Valley School District a letter stating compliance with the requirements of nondiscrimination laws as set forth by Washington State Human Rights Commission.

1.2 RESIDENT EMPLOYEES

The Contractor, or any subcontractor, shall employ ninety-five percent or more bona fide Washington residents as employees where more than forty persons are employed, and ninety percent or more bona fide Washington residents as employees where forty or less persons are employed, and shall otherwise act in accordance with Chapter 39.16 RCW. Except as provided in Chapter 39.16 RCW, if the Contractor (or a subcontractor) employs a nonresident in excess of the percentage preferences, the Contractor (or subcontractor) shall have deducted, for each violation, from the amount due, the prevailing wages which should have been paid to a displaced resident. The money so deducted shall be retained by the Owner.

7. INTENT TO PAY PREVAILING WAGES

A. The contractor and each sub-contractor shall file "Intent to Pay Prevailing Wages" before commencement of the project.

1. Wage Rates - Statutes of Washington, RCW 39.12 as amended shall be a part of this contract. Requirements, in brief, are stated below:

2. There shall be paid each laborer or mechanic of the Contractor or subcontractor engaged in work on the project under this contract in the trade or occupation listed in the schedule of wage rates, as determined by the State Department of Labor and Industries, not less than the hourly wage rate listed therein, regardless of any contractual relationship which may be alleged to exist between the Contractor of any subcontractor and such laborers and mechanics. For every contract in excess of ten thousand dollars, the Contractor shall post in a location readily visible to workers at the job site: (1) a copy of a statement of intent to pay prevailing wages approved by the industrial statistician of the state Department of Labor and Industries under RCW 39.12.040; and (2) the address and telephone number of the industrial statistician of the state Department of Labor and Industries where a complaint or inquiry concerning prevailing wages may be made.

3. The "prevailing rate or wage" contained in the wage determination include health and welfare fund contributions and other fringe benefits collectively bargained for by the various management and labor organizations.

4. In the event established rates change during the period of the contract, bidder will be required to comply with prevailing wages in effect for period in which work is done. Successful bidder will be required to file a "Statement of Intent to Pay Prevailing Wages" before work on the project can be started.

5. In case any dispute arises as to what are the prevailing rates of wages for work of a similar nature and such dispute cannot be adjusted by the parties in interest, including labor and management representatives, the matter shall be referred for arbitration to the Director of the Department of Labor and Industries of the State, and his decision therein shall be final and conclusive and binding on all parties involved in the dispute.

8. AFFIDAVIT OF WAGES PAID.

A. A contractor or subcontractor on a public works project must submit a statement certifying the rate of hourly wage paid each classification of laborer, workman, or mechanic employed by him upon such work has been paid less than the prevailing rate of wage or less than the minimum rate of wages specified in the contract. This certified statement must be submitted before payment of public funds can be made to him for work done on such project.

1. A form to use in preparing the necessary certified statement entitled "Affidavit of Wages Paid" may be procured on line from the Department of Labor and Industries. The affidavit must be submitted with any invoice.
2. Before final payment can be made, Contractor must submit a written "release from liability" from the Department of Labor and Industries stating that the contractor's or any subcontractor's premium payments for industrial insurance are in order. The Owner reserves the right to withhold from payment to the Contractor the amount owing to the Department of Labor and Industries for the hours of work performed by the Contractor or any subcontractor under the contract.

9. PRODUCT DELIVERY

A. All labor, material, or equipment contracted under this order is to be furnished, F.O.B. delivered and installed at the job site. With the exception of bulk coatings, all material shall be delivered to job site in original containers as packaged by the manufacturer with the label intact. The responsibility for the security of any products or equipment on the site will be the contractor's. Any products intended to remain at the site unattended must be secured in a manner acceptable to the school district. Provide a certificate of compliance upon request for bulk materials.

10. PRODUCT HANDLING

A. Protection - The Contractor shall use whatever means are necessary or required to protect the existing fence, walks, landscaping, etc., before, during and after installation and to protect the installed work and other existing surfaces.

B. Replacements - In the event of damage, the Contractor shall immediately make all repairs and replacements necessary to the approval of the owner at no additional cost.

11. TESTING

A. Provide testing when requested by the product manufacturer as a condition of warranty coverage, the building official having jurisdiction for code compliance, and as requested by the Facilities & Construction Manager.

12. SALVAGE AND DISPOSAL

A. All debris shall be disposed at a legal off-site disposal location by the contractor, at contractor's expense. No debris or waste will be placed in school dumpsters or left on site. Debris must be removed on a daily basis. Salvage only those items identified by bid documents and relocate to the District's designated storage.

13. SECURITY SYSTEM AND KEYING

A. The District will occupy the remaining building during routine custodial staffing hours and will control building doors and security systems. The contractor will be responsible for maintaining building security in construction areas during the course of the contract.

14. SANITARY FACILITIES

A. Contractor shall provide and maintain temporary sanitary facilities and enclosures. Existing facilities shall not be used.

15. DISTRICT NO-SMOKING POLICY

A. Smoking of any kind or use or any kind of tobacco is prohibited on all District property.

16. SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

A. The contractor shall review, approve and submit, with reasonable promptness and in such sequence as to cause no delay in the work or in the work of the Owner or any separate contractor, all shop drawings, product, and samples required.

B. No portion of the work requiring submission of a shop drawing, product data, or sample shall be commenced until the submittal has been approved by the owner. All such portions of the work shall be in accordance with approved submittals.

17. PROJECT SCHEDULE

A. The Contractor shall prepare a CPM project schedule for the Snoqualmie Valley School District Facilities dept. approval which includes:

1. Scheduled commencement, substantial completion, and the sequential phases of subcontract work by which construction progress and coordination can be measured.
2. The date(s) for submittals which permit reasonable time for contract review.
3. Date(s) for receipt by Contractor of FDIC items.
4. Utility shutdowns.
5. The contractor shall keep schedules current for on-going Owner review.

18. WORK SCHEDULE

A. Work specified in this contract will occur between the hours of 7:00 AM and 5:00 PM, Monday through Friday, except Holidays.

B. Any work done outside these hours, due to weather or other special circumstances, must have prior approval by the Facilities & Construction Manager. The contractor must perform the work in a timely manner with consistent progress under favorable conditions. No work shall be performed without approval. All work will be coordinated with the Director of Operations, Brandon Klepper, phone 425 831 8005. A 24-hour notice of intent to perform work must be given to the Facilities Project Manager.

19. COORDINATION MEETINGS

A. The school district and the contractor must meet for: (1) a pre-job conference intended to clarify the scope and detail of all work, materials, and other sundry matters; and (2) a post-job inspection of the work completed. The district representative and the contractor will coordinate these meetings at the convenience of both parties.

20. SITE CONDITIONS

A. Existing Conditions: Project drawings approximate the physical character of building and site features known or believed to exist. However, drawing documents cannot document complete and exact physical conditions, nor the means and methods of construction. Bidders and Contractors shall examine existing building and site conditions as a requirement of and prerequisite for bidding the project work.

B. Responsibility for Damage: Any building or site damage resulting from the performance of contract work shall be restored to pre-construction condition as a responsibility of this construction contract.

C. Owner may contract with other contractors for other contract work during the scheduled time for this Work

21. CLEANUP

A. After completion of repairs at each job site, the contractor shall remove all excess materials, debris, and unsightly stains resulting from this contract and make all necessary repairs to any areas damaged during this contract. Work will be accomplished during school hours. **Contractor shall keep areas clear of all debris during the day and at end of work day.**

22. OWNERS RIGHT TO CLEAN UP

A. If a dispute arises between the contractor and separate contractors as to their responsibility for cleaning up, the Owner may clean up and charge the cost thereof to the contractors responsible therefore as the Owner shall determine to be just.

END OF SECTION 00 72 00

SECTION 00 73 00 - PUBLIC WORKS CONDITIONS

PART 1 - GENERAL

1.1 USE OF DOCUMENTS

A. Contract Documents are enumerated in Section 000110 Table of Contents.

1.2 RELATED DOCUMENTS

A. Division 00 and Division 01 apply to the work specified in this Section:

1.3 DESCRIPTION

A. Contract Conditions described in this Section:
   1. Contractor Registration & Licensing Requirements.
   2. Bond & Contract Performance Requirements
   3. Prevailing Wage Requirement
   4. Labor Hours and Overtime
   5. Health & Safety Standards for Workers
   6. Employment & Discrimination
   7. Contract Retainage and Liens

B. Related Requirements Specified Elsewhere:
   1. Section 00 21 13 “Instruction to Bidders”.
   2. Section 00 70 00 “Conditions of the Contract”

1.4 INCORPORATION OF PUBLIC WORK REQUIREMENTS

A. The Bidder and Contractor shall fulfill Public Work bidding and contract statute provisions as if bound herein.

PART 2 - CONTRACTOR REGISTRATION, LICENSING & ELIGIBILITY

2.1 REQUIREMENTS

A. General:
   1. Contract signatories to the Construction Contract, and contractors and subcontractors providing building construction services to the Contract, shall be licensed to perform said work in accordance with Chapter 39.06 RCW.
   2. By entering into this contract, the contractor certifies that neither it nor any person or firm who has an interest in the contractor" firm is a person or firm ineligible to be awarded government contracts.

PART 3 - BONDING FOR CONTRACT PERFORMANCE

3.1 REQUIREMENTS

A. General
1. The General Contractor (signatory to the Construction Contract) shall provide the Owner with both Performance and Material & Labor bonds which bind the General Contractor and Surety Company to completion of Construction Contract work, and fulfillment of contract payment obligations. Bonds shall be purchased, executed, and issued to the Owner, each individually valued at 100% of the Construction Contract amount. The cost of bonds shall be included in the Bid.

B. Bond issuance shall be in compliance with Chapter 39.08 RCW for Public Works with the following stipulations:
1. For Contracts of $25,000 or less, at the Contractor's election, retainage of 50% (of contract award) may be used in lieu of bond security.

C. AIA Document A311 Performance Bond and Material & Labor Bond are incorporated to delineate contract standards as part of the Contract Documents as if bound herein.
1. Within ten days after the issuance of the Notice of Intent to Award Contract, the Contractor shall deliver two copies of the bond to the Owner.
2. The Owner may decline to enter into the contract, withhold its notice to proceed, and/or withhold payment to the Contractor until such Surety Bond is Received.

PART 4 - PREVAILING WAGE

4.1 REQUIREMENTS

A. General
1. Every worker, laborer, and mechanic providing construction-related work in Washington -- regardless of whether work is on-site or off-site -- which pertains to the supply and fabrication of specific construction contract assemblies shall receive prevailing wages in accordance with State Public Works standards Chapter 39.12 RCW.

B. Compliance Standard:
1. Under the provisions of State Statute, the hourly wage paid to laborers, workmen, and mechanics covered under Section 4.01 A — General Requirements of this contract shall not be less than the "Prevailing Wage" (hourly rate and benefit sum) established for that trade or work classification.
2. "Prevailing Wage" shall be contractually defined as the minimum hourly rate and benefit wage —known as Prevailing Wage for Public Works — as established for every construction trade and work classification by the State Department of Labor & Industries.
3. "Prevailing Wage" minimum rates shall be set by the location in which contract work is performed, as published and in-force at the initiation of the contract (for the duration of the contract). It is the responsibility of the general contractor, subcontractors, and all applicable suppliers and fabricators to coordinate compliance with these prevailing wage standards and pay all fees to those governing Agencies having jurisdiction.

C. Compliance Procedure:

1. The Owner shall notify the Dept. of Labor & Industries, Industrial Insurance Division, of an Award of a Public Works Contract.
2. The General Contractor shall file (in triplicate) with the Owner a "Statement of Intent to Pay Prevailing Wages" form (Dept. of Labor & Industries form #F700-029-000), bearing approval by the Industrial Statistician, for each and every trade and work classification on or before the day that trade and work classification commences contract work.
   a. All workers shall be paid journeyman prevailing wage rates, unless a position is an apprenticeship, established by agreement, registered, and approved by the State Apprenticeship council pursuant to Chapter 49.04 RCW.
   b. The General Contractor shall post on-site, positioned readily available to workers, a copy of the intent to pay prevailing wages as approved by the Industrial, and the address and telephone number of the Industrial Statistician (for complaints and inquiries).
   c. Payment cannot be released to the contractor without this documentation.
3. At the conclusion of contract work by any trade and/or work classification, the General Contractor shall file with the Owner (in triplicate) an "Affidavit of Wages Paid" form (Dept. of Labor & Industries form #F700-007-000), bearing approval by the industrial Statistician, for each and every trade and work classification (corresponding to the intent forms on file).
4. Upon the filing of all "Affidavit" Notices approved by Labor and Industries, notice of documentation (by Dept. of Revenue) of tax payments, and resolution (by Dept. of Employment Securities) of workman compensation claims, only then is the Owner authorized to release the final payment of retainage.

PART 5 - LABOR HOURS AND OVERTIME

5.1 REQUIREMENTS

A. General
1. The General Contractor, all sub-contractors, and all subcontract tier contractors shall enforce labor hour and overtime requirements which follow.

B. Contract Work Hours:
1. In accordance with ROW Statute 49.28, a workday shall be deemed to be 8 hours duration, 40 hours per week, except where employees enter into an agreement with their employer to work up to 10 hours per day but not more than 4 calendar days per week.

C. Contract Work Hours -- Overtime:
1. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any laborer or mechanic in any work week in which he or she is employed on such work to work in excess of forty hours in such work week unless such labor or mechanics receives compensation at a rate not less than one and one-half times the base rate of pay for all hours worked in excess of forty hours in such work week.

a. Overtime hours shall be calculated on hours in excess of daily standard shift hours as established for that work week.
b. The Snoqualmie Valley School District shall, at its option, withhold sufficient funds due the contractor or subcontractor to satisfy any liabilities brought about by claims of unpaid wages and resulting liquidated damage penalties. Refer to Part 8 Contract Retainage & Liens.

PART 6 - HEALTH & SAFETY STANDARDS FOR WORKERS

6.1 REQUIREMENTS

A. Employee Safety - General

1. The General Contractor, all sub-contractors, and all tier subcontracts shall be bound by rules and standards established by the Department of Labor Occupational Safety and Health Act of 1970 (Public Law 91-596; 84 Statute 1590) and RCW 49.17, the Washington Industrial Safety and Health Act for employee safety in the performance of contract work.

B. Notification of Safe Working Conditions:

1. The Owner shall inspect all existing structures for asbestos contamination and identify conditions prior to contract work. Abatement (if required) will be provided by the General Contractor for work designated within this contract, The Owner shall provide the contractor with written notification of asbestos contamination conditions and abatement status as required by RCW 49.26.013. Report is provided under Section 003126 Existing Hazardous Material Information — Asbestos Containing Building Materials Site Inspection Report.

2. The General Contractor shall make, keep and maintain accurate records, and shall inform their employees of all field conditions related to employee safety (ROW 49.17.220):

a. Potentially hazardous site conditions and contaminants either present or discovered
b. The presence of toxic materials used in the performance of contract work
c. Complete records with periodic reporting of work-related injuries and illnesses
d. Records documenting employee exposure to potentially toxic or harmful materials (which are required to be monitored or measured)

C. Workers Health & Industrial Insurance:

1. The General Contractor and all subcontracts stemming from the construction contract shall provide for worker medical and industrial insurance coverage and provide direct contributions as required by the Department of Labor & Industries to Washington's Industrial, Medical Aid and Supplemental insurance programs (Title 49 & Title 51 ROW).

PART 7 - EMPLOYMENT & DISCRIMINATION

7.1 REQUIREMENTS

A. Resident Employees:
   1. The Contractor, or any subcontractor, shall employ ninety-five percent or more bona fide Washington residents as employees where more than forty persons are employed, and ninety percent or more bona fide Washington residents as employees where forty or less persons are employed, and shall otherwise act in accordance with Chapter 39.16 RCW. Except as provided in Chapter 39.16 RCW, if the Contractor (or a subcontractor) employs a nonresident in excess of the percentage preferences, the Contractor (or subcontractor) shall have deducted, for each violation, from the amount due, the prevailing wages which should have been paid to a displaced resident. The money so deducted shall be retained by the Owner.

B. Discrimination:
   1. Contractors, subcontractors and suppliers, as a feature of this contract, shall not discriminate in either contract or employment on the basis of race, creed, color, national origin, sex, marital status, age, or the presence of a mental or physical disability.
   2. Failure to adhere to this policy of non-discrimination shall entitle the Kent School District, at its contractual option, to cancel the construction contract and compensate the contracting party only for goods and services (at contract costs) provided and accepted as of that date.
   3. Contractors, subcontractors, and suppliers, where qualified to provide construction contract materials and/or services, shall encourage minority and women-owned business involvement.

PART 8 - CONTRACT RETAINAGE AND LIENS

8.1 REQUIREMENTS

A. Contract Retainage:
   1. In accordance with State Statute RCW 60.28.010 the Contract for Construction shall have a provision to retain 5% of contract monies earned for the protection and payment of any persons, mechanic, subcontractor or materialman who shall perform any labor upon such contract or the doing of said work, and all persons who shall supply such person or persons subcontractors with provisions and supplies for carrying on of such work, and the State with respect to taxes imposed pursuant to Title 82 RCW which may be due from such contractor. These contract funds shall be held as security in a single manner established by contractor selection from the following options:
      a. Retained in a fund by the Owner until thirty days following the final acceptance of said improvements or work as completed; or
      b. Deposited by the Owner in an interest-bearing account in a bank, mutual savings bank, or savings and loan association, not subject to withdrawal until after the final acceptance of said improvements, or work as completed, or until agreed to by

both parties: Provided, that interest on such account shall be paid to the contractor; or

c. Placed in escrow with a bank or trust company by the Owner until thirty days following the final acceptance of said improvement or work as completed. When the moneys reserved are to be placed in escrow, the public body shall issue a check representing the sum of the moneys reserved payable to the bank or trust company and the contractor jointly. Such check shall be converted into bonds and securities chosen by the contractor and approved by the Owner and such bonds and securities shall be held in escrow. Interest on such bonds and securities shall be paid to the contractor as the said interest accrues.

2. Refer to Section 007000 General Conditions of the Contract for Construction, Article 9.2.1.3 for allocation of Schedule of Value funds, in addition to contract retainage, for completion of work during the punch list and closeout period.

8.2 REQUIREMENTS

A. Contract Retainage:
   1. Retainage shall not be released until which time that:
      a. Contract work and all administrative obligations have been satisfactorily completed;
      b. The Owner receives authorization from State Agencies that statute provisions (Dept. of Labor and Industries for prevailing wage, Dept. of Revenue for taxes, and Employment Securities for industrial insurance claims) are in compliance; and
      c. The Owner receives assurances that all outstanding liens have been settled.

B. Settlement of Liens:
   1. To signify that the General Contractor has fulfilled all construction contract financial commitments and obligations, the contractor is hereby required to file the following forms in evidence:
      a. AIA Document 6706 Contractor's Affidavit of Payment of Debts and claims
      b. AIA Document G706A Contractor's Affidavit of Release of Liens
      c. AIA Document 6707 Consent of Surety Company to Final Payment

END OF SECTION 00 73 00

SECTION 00 80 00 – PREVAILING WAGES

PART 1 - GENERAL

1.1 PREVAILING WAGES FOR PUBLIC WORKS

A. The work of this project is subject to the requirements of Chapter 39.12 RCW and the attached prevailing wage rates shall be the minimum rates as specified in RCW Chapter 39.12.

B. Current prevailing wage rates are included as a part of this section.

C. The contractor and each sub-contractor shall file "Intent to Pay Prevailing Wages" before commencement of the project.

1. Wage Rates - Statutes of Washington, RCW 39.12 as amended shall be a part of this contract. Requirements, in brief, are stated below:

2. There shall be paid each laborer or mechanic of the Contractor or subcontractor engaged in work on the project under this contract in the trade or occupation listed in the schedule of wage rates, as determined by the State Department of Labor and Industries, not less than the hourly wage rate listed therein, regardless of any contractual relationship which may be alleged to exist between the Contractor of any subcontractor and such laborers and mechanics. For every contract in excess of ten thousand dollars, the Contractor shall post in a location readily visible to workers at the job site: (1) a copy of a statement of intent to pay prevailing wages approved by the industrial statistician of the state Department of Labor and Industries under RCW 39.12.040; and (2) the address and telephone number of the industrial statistician of the state Department of Labor and Industries where a complaint or inquiry concerning prevailing wages may be made.

3. The "prevailing rate or wage" contained in the wage determination include health and welfare fund contributions and other fringe benefits collectively bargained for by the various management and labor organizations.

4. In the event established rates change during the period of the contract, bidder will be required to comply with prevailing wages in effect for period in which work is done. Successful bidder will be required to file a "Statement of Intent to Pay Prevailing Wages" before work on the project can be started.

5. Wage Determination: The applicable prevailing wages are determined as of the Bid Date for the county in which the Project is located and are available at http://www.lni.wa.gov/TradesLicensing/PrevWage/WageRates/default.asp

6. In case any dispute arises as to what are the prevailing rates of wages for work of a similar nature and such dispute cannot be adjusted by the parties in interest, including labor and management representatives, the matter shall be referred for arbitration to the Director of the Department of Labor and Industries of the State, and his decision therein shall be final and conclusive and binding on all parties involved in the dispute.

D. Affidavit of Wages Paid:
A contractor or subcontractor on a public works project must submit a statement certifying the rate of hourly wage paid each classification of laborer, workman, or mechanic employed by him upon such work has been paid less than the prevailing rate of wage or less than the minimum rate of wages specified in the contract. This certified statement must be submitted before payment of public funds can be made to him for work done on such project.
A form to use in preparing the necessary certified statement entitled "Affidavit of Wages Paid" may be procured from Owner. The affidavit must be submitted in triplicate with any invoice. Before final payment can be made, Contractor must submit a written "release from liability" from the Department of Labor and Industries stating that the contractor's or any subcontractor's premium payments for industrial insurance are in order. The Owner reserves the right to withhold from payment to the Contractor the amount owing to the Department of Labor and Industries for the hours of work performed by the Contractor or any subcontractor under the contract.

END OF SECTION 00 80 00

1.01 GENERAL:

Pursuant to Chapter 39.12 RCW, no worker, laborer, or mechanic employed in the performance of any part of the Work shall be paid less than the “prevailing rate of wage” (in effect as of the date that bids are due) as determined by the Industrial Statistician of the Department of Labor and Industries.

1.02 WAGE DETERMINATION:

The applicable wage determination is attached herein and is made a part of the Contract Documents by reference as though fully set forth herein.

If not attached, then the applicable prevailing wages are determined as of the Bid Date for the county in which the Project is located and are available at http://www.lni.wa.gov/TradesLicensing/PrevWage/WageRates/

1.03 AVAILABILITY AND POSTING:

A copy of the wage determination is available for viewing at the Owner’s office and will be mailed upon request. The Contractor shall also keep a paper copy at the Project site.

1.04 INTERPRETATION:

Any discrepancy between the attached wage determination and the published rates shall be resolved per Section 00 71 00 – General Conditions.

SECTION 00 84 00 - ON-LINE ELECTRONIC PROJECT MANAGEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. This section applies to all Divisions (00 — 45). Make particular reference to:
   1. Section 00 21 13 “Instructions to Bidders”
   2. Section 00 70 00 “Conditions of the Contract”

1.2 DESCRIPTION

A. This Section Specifies the requirement of:
   1. Project management requiring electronic media
   2. Contract obligations to use District web-based information system
   3. Project communications & submittals as electronic transmittals
   4. Project record management

B. Related Requirements Specified Elsewhere:
   1. Section 01 29 00 “Payment Procedures”
   2. Section 01 26 00 “Contract Modification Procedures”
   3. Section 01 33 00 “Submittal Procedures"
   4. Section 01 25 00 “Substitution Procedures”

PART 2 - PROJECT MANAGEMENT

2.1 ELECTRONIC MEDIA REQUIREMENTS

A. General:
   1. The Owner has established an electronic document structure for managing drawings and specifications through the bidding, construction phase, and post construction documentation phase.
   2. In support of the electronic document format, this contract requires signatories to the construction contract, subcontractors of any tier, vendors, and material suppliers to assemble and utilize (wherever possible) project management information and correspondence using electronic means and methods.
   3. The intent of the construction contract, as specified by Section General Conditions to the Contract for Construction, requires that contractor management and all correspondence be computerized in order to be logged and tracked by the District's on-line electronic management system.

2.2 DISTRICT WEB-BASED INFORMATION SYSTEM

A. General:

1. For management of project communications, the transmittal of project data, and the cataloging of project information transferring between parties to the Contract for Construction, the Owner has established a web-based electronic information management system.
2. The web-based information shall be considered (by contract) to be the official and primary medium for the transmission of project communication, information, and direction between the Owner, General Contractor, and the Architect (and architectural consultants).
3. As a feature of this construction contract, the General Contractor shall provide a site superintendent who is versed in electronic file management. (Email, word processing, spreadsheet, electronic scheduling), to manage the progress and transmit electronically information contractually required for performance of the work.
4. The Owner will provide access to the web-based software program, and will provide initial staff training, via a single session, for the contractor and his subcontractors to explain set up and access for full utilization of the system.

PART 3 - PROJECT MANAGEMENT

3.1 DISTRICT WEB-BASED INFORMATION SYSTEM

A. Web-site

1. The District shall operate and maintain a web-site specifically for transmitting and tracking communications among the parties of the contract. This site shall be accessible by internet from any computer and shall have password protections to permit users control over what information is published and how it will be saved.
2. The web-site shall be used exclusively by the parties to the contract and shall include folders and subdivisions to permit the cataloging and transmission of electronic documents pertaining to the project.
3. The benefits of a web-site management system and how it is intended to assist the Contractor and Owner is two-fold:
    a. Project drawings and specifications can be posted for any and all to download. This includes any (up-to-the-minute) revisions as well as a complete record and date of document issuance. Should modifications occur, the system will notify
    b. The web-site becomes the official record of all transactions and events during the course of the project. This includes posting any and all information relevant to the work, (soils reports, structural inspections, etc.), email communications, record of site conditions, changes in the scope of work, and creation of submittal logs.
4. The owner will provide one staff training session for the contractor and his subcontractors to explain set-up and access for full utilization of the on-line system.

3.2 PROJECT COMMUNICATIONS AND SUBMITTALS

A. General:
1. As an integral feature of the Contract for Construction, the Owner, Contractor and the Architect (and the Architect's consultants) shall utilize the on-line electronic project management for all communications and submittal requirements of the project.

B. Specific Requirements.
1. The following communications shall be transmitted through electronic means utilizing the on-line project management system:
   a. Informal communications
   b. Section 01 26 00 "Contract Modification Procedures"
   c. Section 01 29 00 "Payment Procedures" for review prior to formal submittal
   d. Section 01 31 00 "Project Management and Coordination"
   e. Section 01 33 00 "Submittal Requirements" which include:
      1) Schedule of Values
      2) Construction Schedules
      3) List of Proposed Subcontractors
      4) Material and Product Data
      5) Shop Drawing Data
      6) As-Built Record Drawings
2. The Owner realizes there will be documents which cannot be reproduced and/or transmitted via electronic format. This includes, but is not limited to, shop drawings from vendors and product samples. In these incidences, an electronic transmittal shall be filed which designates when and how the materials will be transmitted and the final disposition of the item.

3.3 PROJECT RECORD MANAGEMENT

A. General:
1. The on-line project management system is designed to accept, hold, and notify recipients that information is available for download. As such, it also provides the capacity to store tremendous amounts of information.
2. Use of the management system is intended to store and provide access to any information relevant to the project and do so in a way that information is cataloged, both by character and by date of issuance, for immediate access.
3. The system is intended to provide an archive of all project information.

B. Document Storage:
1. The Architect shall place the full collection of contract documents on the web-site for access by the contractor and his forces. As the contract progresses and documents are modified, new drawings will be issued each time along-side existing files in order to retain a complete history of document revisions.
2. The Contractor shall post requests for information and change order proposals for Architect and Owner response and the disposition of each of these items will be retained by the project management program.
3. With each new entry and status logs of submittals and approvals, the project file is held in one common area in a structured environment, in order to compile a complete history of events.

C. Project Records:

1. Project files will be date stamped and stored in file divisions as defined at the beginning of the project and (in the case of shared access) as mutually agreed up. Each file entry will be date stamped and stored in chronological or numerical order.
2. At the conclusion of the project, or at any point during the project, construction records are available for parties (with access privileges) to download files for their own permanent records.
3. The Owner shall retain these project files in archives for a period of 6 years following the date of project acceptance by the School District Board of Directors.

END OF SECTION 00 84 00

SECTION 01 10 00 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Phased construction.
4. Work by Owner.
5. Work under separate contracts.
6. Owner-furnished products.
7. Access to site.
8. Coordination with occupants.
9. Work restrictions.
10. Specification and Drawing conventions.
11. Miscellaneous provisions.

B. Related Requirements:

1. Section 01 50 00 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

A. Project Identification: Early Childhood Center at Two Rivers School.
1. Project Location: -330 Ballarat Ave N, North Bend, WA 98045.

B. Owner: Snoqualmie Valley School District, 8001 Silva Ave. SE, Snoqualmie, WA, 98065

1. Owner's Representative: Director of Operations, Snoqualmie Valley School District, Contact: Brandon L Klepper, 425-831 8005 | klepperb@svsd410.org.

C. Architect: SCR Architects, 1221 East Pike St. Suite 205, Seattle WA 98122, Contact: Scott Connor 206-228-1014 | Scott@SCR-Arch.com

D. Architect's Consultants: Architect has retained the following design professionals who have prepared designated portions of the Contract Documents:

1. Civil Engineer:
Jacobson Consulting Engineers, 255 S King St. Suite 800, Seattle, WA 98104
Contact: Sascha Eastman, 206-293-9134 | sascha@jacobsonengineers.com

2. Structural Engineer:
Atlas Design Group, 600 1st Ave. Suite 600C, Seattle, WA 98402
Contact: Christopher Padin 253-548-7193 | chris.padin@adg-inc.com

3. Mechanical Engineer:
Bogard Pasqua Engineers, 22121 17th Avenue SE, Suite 111, Bothell, WA 98021
Contact: Lee Bogard, 425-415-6100 | lbogard@bp-eng.com

4. Electrical Engineer:
TFWB Engineers, 1200 Westlake Ave. N. Suite 509, Seattle, WA 98109
Contact: Kevin Wartelle, 206-459-3362 | kevin@tf-wb.com

E. Work Summary:

1. The project scope shall be as established by the project drawings, as specified for project administration (Divisions 00 & 01) and any particular material and/or installation specification requirements which accompany the drawing documents (Divisions 02 through 33) and addendums as issued prior to bid date.

2. Summary of Project Work includes (but is not limited to):
Early Childhood Center at Two Rivers School.

BOARD APPROVAL:	**December 12, 2024**
BID AWARD	**December 13, 2024**
CONDITIONAL NOTICE TO PROCEED:	**December 13, 2024**
***START CONSTRUCTION:**	**December 14, 2024**
*** Contingent on contractor providing required bonds and insurance to sign contract**	
SUBSTANTIAL COMPLETION:	**July 11, 2025**
FINAL COMPLETION:	**September 9, 2024**

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. Construction work to build additions to an older alternative high school to provide a new early childhood center and daycare. Work also includes upgrades to existing structure, site improvements and covered play.

B. Type of Contract:

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

1.5 PHASED CONSTRUCTION

A. No phasing is expected at this time.

1.6 WORK BY OWNER

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

1. No work by Owner is anticipated at this time

1.7 WORK UNDER SEPARATE CONTRACTS

A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying Work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.

B. Subsequent Work: Owner will award separate contract(s) for the following additional work to be performed at site following Substantial Completion. Completion of that work will depend on successful completion of preparatory Work under this Contract.

1. Carpet, floor tile, sheet flooring and wall base except as noted on drawings.
2. Key pad and security.

1.8 OWNER-FURNISHED PRODUCTS

A. Owner will furnish products indicated. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products.

B. Owner-Furnished Products:

1. Toilet Paper Holder (Toilet Tissue (Roll) Dispenser).
2. Paper Towel Dispenser (Standard non-recessed)
3. Soap Dispenser (for Liquid-Soap)

1.9 ACCESS TO SITE

A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.

B. Use of Site: Limit use of Project site to Area of work as indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Limits: Confine construction operations to area of work.

C. 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.

1.10 COORDINATION WITH OCCUPANTS

A. Full Occupancy: Owner will occupy Daycare area during entire construction period until summer break. Cooperate with Owner during construction operations to minimize conflicts and facilitate owner and public usage. Perform the Work so as not to interfere with day-to-day operations.

1. Notify Owner not less than 48 hours in advance of unexpected 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. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of Work.

1.11 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7:00 a.m. to 7:00 p.m., Monday through Friday, unless otherwise indicated.

1. Early Morning Hours, weekends, holidays: As indicated by City of North Bend Municipal code section 8.26.115 “Construction Noise”.

2. Hours for Utility Shutdowns: Verify with Owner.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

1. Notify Owner and Architect not less than fourteen days in advance of pre-planned utility interruptions and two days in advance of unplanned utility interruptions.
2. Obtain Owner's written permission before proceeding with utility interruptions.

D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.

1. Notify Owner not less than two days in advance of proposed disruptive operations.
2. Obtain Owner's written permission before proceeding with disruptive operations.

E. Restricted Substances: Use of tobacco products and other controlled substances within 25' of existing buildings and on Project site is not permitted.

F. Employee Identification: Owner will provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.

G. Employee Screening: Comply with Owner's requirements for screening of Contractor personnel working on Project site.

1. Maintain list of approved screened personnel with Owner's representative.

1.12 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and as shown on Drawings.
3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 10 00

SECTION 01 22 00 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

B. Related Requirements:

1. Section 01 26 00 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
2. Section 01 40 00 "Quality Requirements" for field testing by an independent testing agency.

1.3 DEFINITIONS

A. Unit price is an amount incorporated into the Agreement, 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.

1.4 PROCEDURES

A. Unit prices include all necessary material, plus cost for removal, haul away, disposal fees, 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 schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. Unit Price No. 1: Replacement plywood sheathing:

1. Description: Provide and install plywood sheathing to match existing, where existing plywood is damaged or deteriorating through rot or other means as directed in the field.

2. Unit of Measurement: Price per one 4’ x 8’ sheet of plywood. For bidding, assume 15/32” CDX.

3. Quantity Allowance: The unit price will be used by the School District to determine the lowest bidder by assuming 50 piece of 4’ x 8’ sheet of plywood per the indicated price to the Base Bid and accepted alternates.

END OF SECTION 01 22 00

SECTION 01 25 00 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:
   1. Section 01 60 00 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

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

   1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
   2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

   1. Substitution Request Form: Use facsimile of form provided in Project Manual.
   2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

      a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
      b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.

c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project, from applicable code organization.
j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

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

1.6 PROCEDURES

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

1.7 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Substitution request is fully documented and properly submitted.
c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after the Notice of Award. Requests received after that time may be considered or rejected at discretion of Architect.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
b. Requested substitution does not require extensive revisions to the Contract Documents.

c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
d. Substitution request is fully documented and properly submitted.
e. Requested substitution will not adversely affect Contractor's construction schedule.
f. Requested substitution has received necessary approvals of authorities having jurisdiction.
g. Requested substitution is compatible with other portions of the Work.
h. Requested substitution has been coordinated with other portions of the Work.
i. Requested substitution provides specified warranty.
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 01 25 00

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

B. Related Requirements:

1. Section 01 25 00 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.3 MINOR CHANGES IN THE WORK

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

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. **"Proposal Requests"** issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
2. Within time specified in Proposal Request 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.

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. This form is referred to as a **"Change Order Proposal"** by owner and Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 01 25 00 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use form provided by Owner or may use a standard form used by the Contractor as acceptable to the Architect.

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Change Order Proposal, Architect will issue a **"Change Order"** for signatures of Owner and Contractor on form as determined from by the Architect.

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a **"Construction Change Directive"** on form as determined from by the Architect. 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 01 26 00

SECTION 01 29 00 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Requirements:

1. Section 01 21 00 "Allowances" for procedural requirements governing the handling and processing of allowances.
2. Section 01 22 00 "Unit Prices" for administrative requirements governing the use of unit prices.
3. Section 01 26 00 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
4. Section 01 32 00 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

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

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule. Cost-loaded Critical Path Method Schedule may serve to satisfy requirements for the schedule of values.

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.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:

a. Project name and location.
b. Name of Architect.
c. Architect's Project number.

d. Contractor's name and address.
e. Date of submittal.

2. Arrange schedule of values consistent with format of AIA Document G703.
3. 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.
4. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
   a. Differentiate between items stored on-site and items stored off-site.
5. 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.
6. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate Owner payments or deposits, if any, and balance to be paid by Contractor.
7. Overhead Costs: Include total cost and proportionate share of general overhead and profit for each line item.
8. Overhead Costs: 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. 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.
10. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

1. Submit draft copy of Application for Payment seven days prior to due date for review by Architect.

C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.

2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.

E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:
    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.

H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.

3. Contractor's construction schedule (preliminary if not final).
4. Products list (preliminary if not final).
5. Sustainable design action plans, including preliminary project materials cost data.
6. Schedule of unit prices.
7. Submittal schedule (preliminary if not final).
8. List of Contractor's staff assignments.
9. List of Contractor's principal consultants.
10. Copies of building permits.
11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
12. Initial progress report.
13. Report of preconstruction conference.
14. Certificates of insurance and insurance policies.
15. Performance and payment bonds.
16. Data needed to acquire Owner's insurance.

I. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706.
5. AIA Document G706A.
6. AIA Document G707.
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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 29 00

SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General coordination procedures.
2. Coordination drawings.
3. RFIs.
4. Digital project management procedures.
5. Project meetings.

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

C. Related Requirements:

1. Section 01 32 00 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
2. Section 01 73 00 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Section 01 77 00 "Closeout Procedures" for coordinating closeout of the Contract.
4. Section 01 91 13 "General Commissioning Requirements" for coordinating the Work with Owner's Commissioning Authority.

1.3 DEFINITIONS

A. BIM: Building Information Modeling.

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

1.4 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities, list addresses and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1. Post copies of list in project meeting room, in temporary field office, in web-based Project software directory, Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its own operations with operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

C. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.

5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

1.6 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.

b. Coordinate the addition of trade-specific information to coordination drawings in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.

c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.

d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.

e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.

f. Indicate required installation sequences.

g. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

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

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
2. Plenum Space: Indicate sub-framing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within plenums to accommodate layout of light fixtures and other components indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.

4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
6. Mechanical and Plumbing Work: Show the following:
    a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
    b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
    c. Fire-rated enclosures around ductwork.
7. Electrical Work: Show the following:
    a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
    b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
    c. Panel board, switch board, switchgear, transformer, busway, generator, and motor-control center locations.
    d. Location of pull boxes and junction boxes, dimensioned from column center lines.
8. Fire-Protection System: Show the following:
    a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
9. Review: Architect will review coordination drawings to confirm that in general the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make suitable modifications and resubmit.
10. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 01 33 00 "Submittal Procedures."

C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
2. File Submittal Format: Submit or post coordination drawing files using PDF format.
3. BIM File Incorporation where applicable: Develop and incorporate coordination drawing files into BIM established for Project.
    a. Perform three-dimensional component conflict analysis as part of preparation of coordination drawings. Resolve component conflicts prior to submittal. Indicate where conflict resolution requires modification of design requirements by Architect.
4. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
    a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.

b. Digital Data Software Program: Drawings are available in Revit or AutoCad, depending on specific project.

c. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Architect.

D. Submittal Workflow/Routing: Basic workflow and routing of submittals shall be as follows:

1. From Sub-Contractor to General Contractor (as required).
2. From General Contractor to Architect.
3. If necessary, Architect to Sub-consultant and then response back to Architect.
4. Response from Architect back to General Contractor.
5. Response from General Contractor back to Sub-Contractor (if initially submitted by Sub-contractor).
6. Owner copied on all transfers within Online Project Management.

1.7 REQUEST FOR INFORMATION (RFI)

A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Architect and /or Construction Manager.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to 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. RFI's 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 Order Proposal according to Section 01 26 00 "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 ten 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. Use software log that is part of web-based Project software. Include the following:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.
8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
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.

G. RFI Workflow/Routing: Basic workflow and routing of RFI's shall be as follows:

1. From Sub-Contractor to General Contractor (if initiated by Sub-contractor).
2. From General Contractor to Architect.
3. If necessary, Architect to Sub-consultant and then response back to Architect.
4. Response from Architect back to General Contractor.

5. Response from General Contractor back to Sub-Contractor (if initiated by Sub-contractor).
6. Owner copied on all transfers within Online Project Management.

1.8 DIGITAL PROJECT MANAGEMENT PROCEDURES

A. Use of Architect's Digital Data Files: Digital data files of Architect's BIM model or CAD drawings will be provided by Architect for Contractor's use during construction.

1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project record Drawings.
2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
3. Digital Drawing Software Program: Contract Drawings are available in Revit or AutoCad depending on the project.
4. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Architect.

a. Subcontractors, and other parties granted access by Contractor to Architect's digital data files shall execute a data licensing agreement in the form of Agreement acceptable to Owner and Architect.

B. Web-Based Project Software: Use Owner's web-based Project software site for purposes of hosting and managing Project communication and documentation until Final Completion.

1. Web-based Project software site includes, at a minimum, the following features:

a. Compilation of Project data, including Contractor, subcontractors, Architect, architect's consultants, Owner, and other entities involved in Project. Include names of individuals and contact information.
b. Access control for each entity for each workflow process, to determine entity's digital rights to create, modify, view, and print documents.
c. Document workflow planning, allowing customization of workflow between project entities.
d. Creation, logging, tracking, and notification for Project communications required in other Specification Sections, including, but not limited to, RFIs, submittals, Minor Changes in the Work, Construction Change Directives, and Change Orders.
e. Track status of each Project communication in real time, and log time and date when responses are provided.
f. Procedures for handling PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.
g. Processing and tracking of contract modifications.
h. Payment applications will be handled separately outside the Web-Based Project Software.
i. Creating and distributing meeting minutes.
j. Document management for Drawings, Specifications, and coordination drawings, including revision control.
k. Management of construction progress photographs.
l. Mobile device compatibility, including smartphones and tablets.

2. At completion of Project, provide digital archive in format that is readable by common desktop software applications in format acceptable to Architect. Provide data in locked format to prevent further changes.

C. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.
3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.9 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, Construction Manager, 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 Thirty days after execution of the Agreement.

1. Attendees: Authorized representatives of Owner**,** Construction Manager**,** 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. Use of web-based Project software.
h. Procedures for processing field decisions and Change Orders.
i. Procedures for RFIs.

j. Procedures for testing and inspecting.
k. Procedures for processing Applications for Payment.
l. Distribution of the Contract Documents.
m. Submittal procedures.
n. Sustainable design requirements.
o. Preparation of Record Documents.
p. Use of the premises.
q. Work restrictions.
r. Working hours.
s. Owner's occupancy requirements.
t. Responsibility for temporary facilities and controls.
u. Procedures for moisture and mold control.
v. Procedures for disruptions and shutdowns.
w. Construction waste management and recycling.
x. Parking availability.
y. Office, work, and storage areas.
z. Equipment deliveries and priorities.
aa. First aid.
bb. Security.
cc. 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**,** Construction Manager, and Owner 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. Sustainable design requirements.
i. Review of mockups.
j. Possible conflicts.
k. Compatibility requirements.
l. Time schedules.

m. Weather limitations.
n. Manufacturer's written instructions.
o. Warranty requirements.
p. Compatibility of materials.
q. Acceptability of substrates.
r. Temporary facilities and controls.
s. Space and access limitations.
t. Regulations of authorities having jurisdiction.
u. Testing and inspecting requirements.
v. Installation procedures.
w. Coordination with other work.
x. Required performance results.
y. Protection of adjacent work.
z. 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 90 days prior to the scheduled date of Substantial Completion.

1. Conduct the conference to review requirements and responsibilities related to Project closeout.
2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Construction Manager, 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 weekly intervals subject to adjustment.

1. Coordinate dates of meetings with preparation of payment requests.

2. Attendees: In addition to representatives of Owner**,** Construction Manager**,** and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

1) Review schedule for next period.

b. Review present and future needs of each entity present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Resolution of BIM component conflicts.
4) Status of submittals.
5) Status of sustainable design documentation.
6) Deliveries.
7) Off-site fabrication.
8) Access.
9) Site use.
10) Temporary facilities and controls.
11) Progress cleaning.
12) Quality and work standards.
13) Status of correction of deficient items.
14) Field observations.
15) Status of RFIs.

16) Status of Proposal Requests.
17) Pending changes.
18) Status of Change Orders.
19) Pending claims and disputes.
20) 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 appropriate intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

1. Attendees: In addition to representatives of Owner, Construction Manager, 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) Resolution of BIM component conflicts.
4) Status of submittals.
5) Deliveries.
6) Off-site fabrication.
7) Access.
8) Site use.
9) Temporary facilities and controls.

10) Work hours.
11) Hazards and risks.
12) Progress cleaning.
13) Quality and work standards.
14) Status of RFIs.
15) Proposal Requests.
16) Change Orders.
17) Pending changes.

3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. 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.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: The allocation of the schedule of values for completing an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum.

C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

E. Event: The starting or ending point of an activity.

F. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

G. Resource Loading: The allocation of manpower and equipment necessary for completing an activity as scheduled.

1.4 INFORMATIONAL SUBMITTALS

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

1. Working electronic copy of schedule file, where indicated.
2. PDF file.

B. Startup construction schedule.

1. Submittal of cost-loaded, startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.

C. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.

D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.

E. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of preceding and succeeding activities for each activity, sorted in ascending order by activity number and then by early start date, or actual start date if known.
3. Total Float Report: List of activities sorted in ascending order of total float.
4. Earnings Report: Compilation of Contractor's total earnings from commencement of the Work until most recent Application for Payment.

F. Construction Schedule Updating Reports: Submit with Applications for Payment.

G. Daily Construction Reports: Submit at weekly intervals.

H. Material Location Reports: Submit at weekly intervals.

I. Site Condition Reports: Submit at time of discovery of differing conditions.

J. Unusual Event Reports: Submit at time of unusual event.

K. Qualification Data: For scheduling consultant.

1.5 QUALITY ASSURANCE

A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Architect's request.

B. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's Construction Schedule, including, but not limited to, the following:

1. Review software limitations and content and format for reports.
2. Verify availability of qualified personnel needed to develop and update schedule.
3. Review delivery dates for Owner-furnished products.
4. Review schedule for work of Owner's separate contracts.
5. Review submittal requirements and procedures.
6. Review time required for review of submittals and resubmittals.
7. Review requirements for tests and inspections by independent testing and inspecting agencies.
8. Review time required for Project closeout and Owner startup procedures.
9. Review and finalize list of construction activities to be included in schedule.
10. Review procedures for updating schedule.

1.6 COORDINATION

A. Coordinate Contractor's Construction Schedule with the schedule of values submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

1.7 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

B. Time Frame: Extend schedule from date established for commencement of the Work to date of final completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

C. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.

2. Submittal Review Time: Include review and resubmittal times indicated in Section 01 33 00 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
3. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
4. 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.
5. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.

D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section 01 10 00 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
2. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 01 10 00 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
3. Work Restrictions: Show the effect of the following items on the schedule:
   a. Environmental control.

4. 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.

E. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.

1. See Section 01 29 00 "Payment Procedures" for cost reporting and payment procedures.

F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

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

G. 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.

H. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.

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

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

1.8 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 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

1.9 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.

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

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

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

1.10 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.
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.

B. Material Location Reports: At weekly 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.

D. 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 01 32 00

SECTION 01 32 33 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Preconstruction photographs.
2. Periodic construction photographs.
3. Final completion construction photographs.

B. Related Requirements:

1. Section 01 77 00 "Closeout Procedures" for submitting photographic documentation as Project Record Documents at Project closeout.
2. Section 01 79 00 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.
3. Section 02 41 19 "Selective Demolition" for photographic documentation before selective demolition operations commence.

1.3 INFORMATIONAL SUBMITTALS

A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.

B. Digital Photographs: Submit image files within three days of taking photographs.

1. Submit photos by uploading to web-based project software site. Include copy of key plan indicating each photograph's location and direction.
2. Identification: Provide the following information with each image description in web-based project software site:

a. Name of Project.
b. Name and contact information for photographer.
c. Name of Architect.
d. Name of Contractor.
e. Date photograph was taken.
f. Description of location, vantage point, and direction.
g. Unique sequential identifier keyed to accompanying key plan.

1.4 QUALITY ASSURANCE

A. Construction Webcam Service Provider: A firm specializing in providing photographic equipment, web-based software, and related services for construction projects, with record of providing satisfactory services similar to those required for Project.

1.5 FORMATS AND MEDIA

A. Digital Photographs: Provide color images in JPG format, produced by a digital camera with minimum sensor size of 12 megapixels, and at an image resolution of not less than 3200 by 2400 pixels. Use flash in low light levels or backlit conditions.

B. Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

C. Metadata: Record accurate date and time from camera.

D. File Names: Name media files with date, Project area and sequential numbering suffix.

1.6 CONSTRUCTION PHOTOGRAPHS

A. Photographer: Engage a qualified photographer to take construction photographs.

B. General: Take photographs with maximum depth of field and in focus.

1. Maintain key plan with each set of construction photographs that identifies each photographic location.

2. Retain "Preconstruction Photographs" Paragraph below if required to show preexisting conditions. Coordinate with pre-demolition photographs specified in Section 02 41 16 "Structure Demolition," Section 02 41 19 "Selective Demolition," and Section 31 10 00 "Site Clearing."

C. Preconstruction Photographs: Before starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.

1. Flag construction limits before taking construction photographs.
2. Take 20 photographs to show existing conditions adjacent to property before starting the Work.
3. Take 20 photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.

D. Periodic Construction Photographs: Take 20 photographs weekly. Select vantage points to show status of construction and progress since last photographs were taken.

E. Final Completion Construction Photographs: Take 20 photographs after date of Substantial Completion for submission as Project Record Documents. Architect will inform photographer of desired vantage points.

F. Additional Photographs: Architect may request photographs in addition to periodic photographs specified. Additional photographs will be paid for by Change Order and are not included in the Contract Sum.

1. Three days' notice will be given, where feasible.
2. In emergency situations, take additional photographs within 24 hours of request.
3. Circumstances that could require additional photographs include, but are not limited to, the following:

a. Special events planned at Project site.
b. Immediate follow-up when on-site events result in construction damage or losses.
c. Photographs to be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or unit-cost allowances.
d. Substantial Completion of a major phase or component of the Work.
e. Extra record photographs at time of final acceptance.
f. Owner's request for special publicity photographs.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 32 33

SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

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

B. Related Requirements:

1. Section 01 29 00 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Section 01 31 00 "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
3. Section 01 32 00 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
4. Section 01 32 33 "Photographic Documentation" for submitting preconstruction photographs, periodic construction photographs, and final completion construction photographs.
5. Section 01 40 00 "Quality Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
6. Section 01 77 00 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
7. Section 01 78 23 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
8. Section 01 78 39 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
9. Section 01 79 00 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying

with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.4 SUBMITTAL SCHEDULE

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

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

    a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

4. Format: Arrange the following information in a tabular format:

    a. Scheduled date for first submittal.
    b. Specification Section number and title.
    c. Submittal Category: Action; informational.
    d. Name of subcontractor.
    e. Description of the Work covered.
    f. Scheduled date for Architect's final release or approval.
    g. Scheduled dates for purchasing.
    h. Scheduled date of fabrication.
    i. Scheduled dates for installation.
    j. Activity or event number.

1.5 SUBMITTAL FORMATS

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

1. Project name.
2. Date.
3. Name of Architect.
4. Name of Contractor.
5. Name of firm or entity that prepared submittal.
6. Names of subcontractor, manufacturer, and supplier.
7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.

8. Category and type of submittal.
9. Submittal purpose and description.
10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
11. Drawing number and detail references, as appropriate.
12. Indication of full or partial submittal.
13. Location(s) where product is to be installed, as appropriate.
14. Other necessary identification.
15. Remarks.
16. Signature of transmitter.

B. Options: Identify options requiring selection by Architect.

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

D. Submittals for Web-Based Project Software: Prepare submittals as PDF files, or other format indicated by Project software website.

1.6 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Web-Based Project Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections so processing will not be delayed because of need to review submittals concurrently for coordination.

a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension

of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 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.

5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.

    a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.

D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.7 SUBMITTAL REQUIREMENTS

A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.

e. Testing by recognized testing agency.
f. Application of testing agency labels and seals.
g. Notation of coordination requirements.
h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

a. Wiring diagrams that show factory-installed wiring.
b. Printed performance curves.
c. Operational range diagrams.
d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before Shop Drawings, and before or concurrent with Samples.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless submittal based on Architect's digital data drawing files is otherwise permitted.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

a. Identification of products.
b. Schedules.
c. Compliance with specified standards.
d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

2. Paper Sheet Size: Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
a. Three opaque copies of each submittal. Architect will retain two copies; remainder will be returned.

3. BIM Incorporation: Develop and incorporate Shop Drawing files into BIM established for Project.

C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Permanently attach label on unexposed side of Samples that includes the following:

a. Project name and submittal number.
b. Generic description of Sample.
c. Product name and name of manufacturer.

d. Sample source.
e. Number and title of applicable Specification Section.
f. Specification paragraph number and generic name of each item.

3. Web-Based Project Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

    a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

    a. Number of Samples: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

    a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned.

        1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
        2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
2. Manufacturer and product name, and model number if applicable.

3. Number and name of room or space.
4. Location within room or space.

E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

F. 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.

G. Certificates:

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

H. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents.

Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

    a. Name of evaluation organization.
    b. Date of evaluation.
    c. Time period when report is in effect.
    d. Product and manufacturers' names.
    e. Description of product.
    f. Test procedures and results.
    g. Limitations of use.

1.8 CONTRACTOR'S REVIEW

A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Contractor's Approval: Indicate Contractor's approval for each submittal with indication in web-based Project software. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

    1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

1.9 ARCHITECT'S REVIEW

A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required**,** and return it.

    1. Submittals by Web-Based Project Software: Architect will indicate, through Project software website, the appropriate action.

        a. Actions taken by indication through the Project software website have the following meanings:
            1) Final Unrestricted Release: Where submittals are marked “Reviewed, No Exceptions,” that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.
            2) Final-But-Restricted Release: When submittals are marked “Reviewed, Exceptions as Noted,” that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.

3) Returned for Resubmittal: When submittal is marked “Reviewed, Revise and Submit,” do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.
   a) Do not permit submittals marked “Reviewed, Revise and Resubmit” to be used at the Project Site or elsewhere where Work is in progress.
4) Returned for Resubmittal: When submittal is marked “Submit Specified Item,” do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.
   a) Do not permit submittals marked “Submit Specified Item” to be used at the Project Site or elsewhere where Work is in progress.
5) Returned for Resubmittal: When submittal is marked “Rejected,” do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery or other activity. Revise and prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.
   a. Do not permit submittals marked “Rejected” to be used at the Project Site or elsewhere where Work is in progress.

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.

G. PRODUCTS (Not Used)

H. EXECUTION (Not Used)

END OF SECTION 01 33 00

SECTION 01 35 16 - ALTERATION PROJECT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes special procedures for alteration work.

1.3 DEFINITIONS

A. Alteration Work: This term includes remodeling, renovation, repair, and maintenance work performed within existing spaces or on existing surfaces as part of the Project.

B. Consolidate: To strengthen loose or deteriorated materials in place.

C. Design Reference Sample: A sample that represents the Architect's prebid selection of work to be matched; it may be existing work or work specially produced for the Project.

D. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

E. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Architect.

F. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.

G. Repair: To correct damage and defects, retaining existing materials, features, and finishes. This includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.

H. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.

I. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.

J. Reproduce: To fabricate a new item, accurate in detail to the original, and from either the same or a similar material as the original, unless otherwise indicated.

K. Retain: To keep existing items that are not to be removed or dismantled.

L. Strip: To remove existing finish down to base material unless otherwise indicated.

1.4 COORDINATION

A. Alteration Work Subschedule: A construction schedule coordinating the sequencing and scheduling of alteration work for entire Project, including each activity to be performed, and based on Contractor's Construction Schedule. Secure time commitments for performing critical construction activities from separate entities responsible for alteration work.

1. Schedule construction operations in sequence required to obtain best Work results.
2. Coordinate sequence of alteration work activities to accommodate the following:

    a. Owner's continuing occupancy of portions of existing building.
    b. Owner's partial occupancy of completed Work.
    c. Other known work in progress.
    d. Tests and inspections.

3. Detail sequence of alteration work, with start and end dates.
4. Utility Services: Indicate how long utility services will be interrupted. Coordinate shutoff, capping, and continuation of utility services.
5. Use of elevator and stairs.
6. Equipment Data: List gross loaded weight, axle-load distribution, and wheel-base dimension data for mobile and heavy equipment proposed for use in existing structure. Do not use such equipment without certification from Contractor's professional engineer that the structure can support the imposed loadings without damage.

1.5 PROJECT MEETINGS FOR ALTERATION WORK

A. Preliminary Conference for Alteration Work: Before starting alteration work, Architect will conduct conference at Project site.

1. Attendees: In addition to representatives of Owner, Construction Manager, Architect, and Contractor, and testing service representative shall be represented at the meeting.
2. Agenda: Discuss items of significance that could affect progress of alteration work, including review of the following:

    a. Alteration Work Subschedule: Discuss and finalize; verify availability of materials, specialists' personnel, equipment, and facilities needed to make progress and avoid delays.
    b. Fire-prevention plan.
    c. Governing regulations.
    d. Areas where existing construction is to remain and the required protection.
    e. Hauling routes.
    f. Sequence of alteration work operations.

g. Storage, protection, and accounting for salvaged and specially fabricated items.
h. Existing conditions, staging, and structural loading limitations of areas where materials are stored.
i. Qualifications of personnel assigned to alteration work and assigned duties.
j. Requirements for extent and quality of work, tolerances, and required clearances.
k. Embedded work such as flashings and lintels, special details, collection of waste, protection of occupants and the public, and condition of other construction that affects the Work or will affect the work.

3. Reporting: Architect will record conference results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from conference.

B. Coordination Meetings: Conduct coordination meetings specifically for alteration work at weekly intervals. 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, Construction Manager, Architect, and Contractor, each specialist, supplier, installer, and other entity concerned with progress or involved in planning, coordination, or performance of alteration work activities shall be represented at these meetings. All participants at conference shall be familiar with Project and authorized to conclude matters relating to alteration work.
2. Agenda: Review and correct or approve minutes of previous coordination meeting. Review other items of significance that could affect progress of alteration work. Include topics for discussion as appropriate to status of Project.

a. Alteration Work Subschedule: Review progress since last coordination meeting. Determine whether each schedule item is on time, ahead of schedule, or behind schedule. Determine how construction behind schedule will be expedited with retention of quality; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities are completed within the Contract Time.
b. Schedule Updating: Revise Contractor's Alteration Work Subschedule after each coordination meeting where revisions to schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
c. Review present and future needs of each entity present, including review items listed in the "Preliminary Conference for Alteration Work" Paragraph in this article and the following:
    1) Status of submittals for alteration work.
    2) Access to alteration work locations.
    3) Effectiveness of fire-prevention plan.
    4) Quality and work standards of alteration work.
    5) Change Orders for alteration work.

3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.6 MATERIALS OWNERSHIP

A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered or uncovered during the Work, regardless of whether they were previously documented, remain Owner's property.

1. Carefully dismantle and salvage each item or object in a manner to prevent damage and protect it from damage, then promptly deliver it to Owner where directed at Project site.

1.7 INFORMATIONAL SUBMITTALS

A. Alteration Work Subschedule:

1. Submit alteration work subschedule within seven days of date established for commencement of alteration work.

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

C. Alteration Work Program: Submit 10 days before work begins.

D. Fire-Prevention Plan: Submit 10 days before work begins.

1.8 QUALITY ASSURANCE

A. Title X Requirement: Each firm conducting activities that disturb painted surfaces shall be a "Lead-Safe Certified Firm" according to 40 CFR 745, Subpart E, and use only workers that are trained in lead-safe work practices.

B. Alteration Work Program: Prepare a written plan for alteration work for whole Project, including each phase or process and protection of surrounding materials during operations. Show compliance with indicated methods and procedures specified in this and other Sections. Coordinate this whole-Project alteration work program with specific requirements of programs required in other alteration work Sections.

1. Dust and Noise Control: Include locations of proposed temporary dust- and noise-control partitions and means of egress from occupied areas coordinated with continuing on-site operations and other known work in progress.
2. Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.

C. Fire-Prevention Plan: Prepare a written plan for preventing fires during the Work, including placement of fire extinguishers, fire blankets, rag buckets, and other fire-control devices during each phase or process. Coordinate plan with Owner's fire-protection equipment and requirements. Include fire-watch personnel's training, duties, and authority to enforce fire safety.

D. Safety and Health Standard: Comply with ANSI/ASSE A10.6.

1.9 STORAGE AND HANDLING OF SALVAGED MATERIALS

A. Salvaged Materials:

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

B. Salvaged Materials for Reinstallation:

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

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

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

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

E. Storage Space:

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

1.10 FIELD CONDITIONS

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

1. Comply with requirements specified in Section 01 32 33 "Photographic Documentation."

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

C. Size Limitations in Existing Spaces: Materials, products, and equipment used for performing the Work and for transporting debris, materials, and products shall be of sizes that clear surfaces within existing spaces, areas, rooms, and openings, including temporary protection, by 12 inches or more.

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 PROTECTION

A. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from alteration work.

1. Use only proven protection methods, appropriate to each area and surface being protected.
2. Provide temporary barricades, barriers, and directional signage to exclude the public from areas where alteration work is being performed.
3. Erect temporary barriers to form and maintain fire-egress routes.
4. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during alteration work.
5. Contain dust and debris generated by alteration work and prevent it from reaching the public or adjacent surfaces.
6. Provide shoring, bracing, and supports as necessary. Do not overload structural elements.
7. Protect floors and other surfaces along hauling routes from damage, wear, and staining.
8. Provide supplemental sound-control treatment to isolate demolition work from other areas of the building.

B. Temporary Protection of Materials to Remain:

1. Protect existing materials with temporary protections and construction. Do not remove existing materials unless otherwise indicated.
2. Do not attach temporary protection to existing surfaces except as indicated as part of the alteration work program.

C. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.

D. Utility and Communications Services:

1. Notify Owner, Architect, authorities having jurisdiction, and entities owning or controlling wires, conduits, pipes, and other services affected by alteration work before commencing operations.
2. Disconnect and cap pipes and services as required by authorities having jurisdiction, as required for alteration work.
3. Maintain existing services unless otherwise indicated; keep in service, and protect against damage during operations. Provide temporary services during interruptions to existing utilities.

E. Existing Drains: Prior to the start of work in an area, test drainage system to ensure that it is functioning properly. Notify Architect immediately of inadequate drainage or blockage. Do not begin work in an area until the drainage system is functioning properly.

1. Prevent solids such as adhesive or mortar residue or other debris from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from alteration work.
2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

3.2 PROTECTION FROM FIRE

A. General: Follow fire-prevention plan and the following:

1. Comply with NFPA 241 requirements unless otherwise indicated.
2. Remove and keep area free of combustibles, including rubbish, paper, waste, and chemicals, unless necessary for the immediate work.

a. If combustible material cannot be removed, provide fire blankets to cover such materials.

B. Heat-Generating Equipment and Combustible Materials: Comply with the following procedures while performing work with heat-generating equipment or combustible materials, including welding, torch-cutting, soldering, brazing, removing paint with heat, or other operations where open flames or implements using high heat or combustible solvents and chemicals are anticipated:

1. As far as practicable, restrict heat-generating equipment to shop areas or outside the building.
2. Do not perform work with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use a combustible gas indicator test to ensure that the area is safe.
3. Use fireproof baffles to prevent flames, sparks, hot gases, or other high-temperature material from reaching surrounding combustible material.

4. Prevent the spread of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.
5. Fire Watch: Before working with heat-generating equipment or combustible materials, station personnel to serve as a fire watch at each location where such work is performed. Fire-watch personnel shall have the authority to enforce fire safety. Station fire watch according to NFPA 51B, NFPA 241, and as follows:

C. Fire-Control Devices: Provide and maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids. Maintain each as suitable for the type of fire risk in each work area. Ensure that nearby personnel and the fire-watch personnel are trained in fire-extinguisher and blanket use.

D. Sprinklers: Where sprinkler protection exists and is functional, maintain it without interruption while operations are being performed. If operations are performed close to sprinklers, shield them temporarily with guards.

1. Remove temporary guards at the end of work shifts, whenever operations are paused, and when nearby work is complete.

3.3 PROTECTION DURING APPLICATION OF CHEMICALS

A. Protect motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm or spillage resulting from applications of chemicals and adhesives.

B. Cover adjacent surfaces with protective materials that are proven to resist chemicals selected for Project unless chemicals being used will not damage adjacent surfaces as indicated in alteration work program. Use covering materials and masking agents that are waterproof and UV resistant and that will not stain or leave residue on surfaces to which they are applied. Apply protective materials according to manufacturer's written instructions. Do not apply liquid masking agents or adhesives to painted or porous surfaces. When no longer needed, promptly remove protective materials.

C. Do not apply chemicals during winds of sufficient force to spread them to unprotected surfaces.

D. Neutralize alkaline and acid wastes and legally dispose of off Owner's property.

E. Collect and dispose of runoff from chemical operations by legal means and in a manner that prevents soil contamination, soil erosion, undermining of paving and foundations, damage to landscaping, or water penetration into building interior.

3.4 GENERAL ALTERATION WORK

A. Have specialty work performed only by qualified specialists.

B. Ensure that supervisory personnel are present when work begins and during its progress.

C. Record existing work before each procedure (preconstruction), and record progress during the work. Use digital preconstruction documentation photographs or video recordings. Comply with requirements in Section 01 32 33 "Photographic Documentation."

D. Perform surveys of Project site as the Work progresses to detect hazards resulting from alterations.

E. Notify Architect of visible changes in the integrity of material or components whether from environmental causes including biological attack, UV degradation, freezing, or thawing or from structural defects including cracks, movement, or distortion.

1. Do not proceed with the work in question until directed by Architect.

END OF SECTION 01 35 16

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

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.
4. Specific test and inspection requirements are not specified in this Section.

1.3 DEFINITIONS

A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

B. Field Quality-Control Tests: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

D. Mockups: Full-size physical assemblies that are constructed on-site either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

1. Laboratory Mockups: Full-size physical assemblies constructed and tested at testing facility to verify performance characteristics.
2. Integrated Exterior Mockups: Mockups of the exterior envelope constructed on-site as freestanding temporary built elements or as part of permanent construction, consisting of multiple products, assemblies, and subassemblies.
3. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes; doors; windows; millwork; casework; specialties; furnishings and equipment; and lighting.

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.

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: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as 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.

1.4 CONFLICTING REQUIREMENTS

A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements are specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with

the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for direction before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 INFORMATIONAL SUBMITTALS

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

B. Qualification Data: For Contractor's quality-control personnel.

C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:

1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
2. Main wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.

D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

F. Reports: Prepare and submit certified written reports and documents as specified.

G. 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 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 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 whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

1.7 QUALITY ASSURANCE

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

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

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

1.8 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. Payment for these services will be made from testing and inspection allowances, as authorized by Change Orders.
3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Engage a qualified testing agency to perform quality-control services.

    a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

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 01 33 00 "Submittal Procedures."

F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

G. Associated Contractor Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 ACCEPTABLE TESTING AGENCIES

A. Geotech: Associated Earth Sciences, Inc.

B. Concrete, Steel and other items requiring 3rd party testing: Mayes Testing Engineers, Inc.

3.2 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

1. Submit log at Project closeout as part of Project Record Documents.

3.3 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 01 73 00 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 40 00

SECTION 01 42 00 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."

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

1. AABC - Associated Air Balance Council; www.aabc.com.
2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
3. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
4. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
5. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
6. ABMA - American Boiler Manufacturers Association; www.abma.com.
7. ACI - American Concrete Institute; (Formerly: ACI International); www.concrete.org
8. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
9. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
10. AF&PA - American Forest & Paper Association; www.afandpa.org.
11. AGA - American Gas Association; www.aga.org.
12. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
13. AI - Asphalt Institute; www.asphaltinstitute.org.
14. AIA - American Institute of Architects (The); www.aia.org.
15. AISC - American Institute of Steel Construction; www.aisc.org.
16. AISI - American Iron and Steel Institute; www.steel.org.
17. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
18. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
19. ANSI - American National Standards Institute; www.ansi.org.
20. APA - APA - The Engineered Wood Association; www.apawood.org.
21. APA - Architectural Precast Association; www.archprecast.org.
22. API - American Petroleum Institute; www.api.org.
23. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).

24. ARI - American Refrigeration Institute; (See AHRI).
25. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
26. ASCE - American Society of Civil Engineers; www.asce.org.
27. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
28. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
29. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
30. ASSE - American Society of Safety Engineers (The); www.asse.org.
31. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
32. ASTM - ASTM International; www.astm.org.
33. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
34. AWEA - American Wind Energy Association; www.awea.org.
35. AWI - Architectural Woodwork Institute; www.awinet.org.
36. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
37. AWPA - American Wood Protection Association; www.awpa.com.
38. AWS - American Welding Society; www.aws.org.
39. AWWA - American Water Works Association; www.awwa.org.
40. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
41. BICSI - BICSI, Inc.; www.bicsi.org.
42. CDA - Copper Development Association; www.copper.org.
43. CEA - Consumer Electronics Association; www.ce.org.
44. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
45. CGA - Compressed Gas Association; www.cganet.com.
46. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
47. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
48. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
49. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
50. CPA - Composite Panel Association; www.pbmdf.com.
51. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
52. CRRC - Cool Roof Rating Council; www.coolroofs.org.
53. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
54. CSA - CSA Group; www.csa.ca.
55. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.
56. CSI - Construction Specifications Institute (The); www.csinet.org.
57. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
58. CWC - Composite Wood Council; (See CPA).
59. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
60. DHI - Door and Hardware Institute; www.dhi.org.
61. ECA - Electronic Components Association; (See ECIA).
62. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
63. ECIA - Electronic Components Industry Association; www.eciaonline.org.
64. EIA - Electronic Industries Alliance; (See TIA).
65. EIMA - EIFS Industry Members Association; www.eima.com.

66. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
67. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org .
68. ESTA - Entertainment Services and Technology Association; (See PLASA).
69. ETL - Intertek (See Intertek); www.intertek.com.
70. EVO - Efficiency Valuation Organization; www.evo-world.org.
71. FCI - Fluid Controls Institute; www.fluidcontrolsinstitute.org.
72. FM Approvals - FM Approvals LLC; www.fmglobal.com.
73. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
74. FSA - Fluid Sealing Association; www.fluidsealing.com.
75. FSC - Forest Stewardship Council U.S.; www.fscus.org.
76. GA - Gypsum Association; www.gypsum.org.
77. GANA - Glass Association of North America; www.glasswebsite.com.
78. GS - Green Seal; www.greenseal.org.
79. HI - Hydraulic Institute; www.pumps.org.
80. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
81. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
82. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
83. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
84. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
85. IAS - International Accreditation Service; www.iasonline.org.
86. IAS - International Approval Services; (See CSA).
87. ICBO - International Conference of Building Officials; (See ICC).
88. ICC - International Code Council; www.iccsafe.org.
89. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
90. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
91. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
92. IEC - International Electrotechnical Commission; www.iec.ch.
93. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
94. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
95. IESNA - Illuminating Engineering Society of North America; (See IES).
96. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
97. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
98. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
99. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
100. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
101. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
102. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
103. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
104. ISO - International Organization for Standardization; www.iso.org.
105. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
106. ITU - International Telecommunication Union; www.itu.int/home.
107. LMA - Laminating Materials Association; (See CPA).
108. LPI - Lightning Protection Institute; www.lightning.org.
109. MBMA - Metal Building Manufacturers Association; www.mbma.com.

110. MCA - Metal Construction Association; www.metalconstruction.org.
111. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
112. MHIA - Material Handling Industry of America; www.mhia.org.
113. MMPA - Moulding & Millwork Producers Association; www.wmmpa.com.
114. MPI - Master Painters Institute; www.paintinfo.com.
115. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
116. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
117. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
118. NADCA - National Air Duct Cleaners Association; www.nadca.com.
119. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
120. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
121. NBI - New Buildings Institute; www.newbuildings.org.
122. NCMA - National Concrete Masonry Association; www.ncma.org.
123. NEBB - National Environmental Balancing Bureau; www.nebb.org.
124. NECA - National Electrical Contractors Association; www.necanet.org.
125. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
126. NEMA - National Electrical Manufacturers Association; www.nema.org.
127. NETA - InterNational Electrical Testing Association; www.netaworld.org.
128. NFPA - National Fire Protection Association; www.nfpa.org.
129. NFPA - NFPA International; (See NFPA).
130. NFRC - National Fenestration Rating Council; www.nfrc.org.
131. NHLA - National Hardwood Lumber Association; www.nhla.com.
132. NLGA - National Lumber Grades Authority; www.nlga.org.
133. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
134. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
135. NRCA - National Roofing Contractors Association; www.nrca.net.
136. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
137. NSF - NSF International; www.nsf.org.
138. NSPE - National Society of Professional Engineers; www.nspe.org.
139. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
140. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
141. NWFA - National Wood Flooring Association; www.nwfa.org.
142. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
143. PDI - Plumbing & Drainage Institute; www.pdionline.org.
144. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); http://www.plasa.org.
145. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
146. RFCI - Resilient Floor Covering Institute; www.rfci.com.
147. RIS - Redwood Inspection Service; www.redwoodinspection.com.
148. SAE - SAE International; www.sae.org.
149. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
150. SDI - Steel Deck Institute; www.sdi.org.
151. SDI - Steel Door Institute; www.steeldoor.org.
152. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
153. SIA - Security Industry Association; www.siaonline.org.

154. SJI - Steel Joist Institute; www.steeljoist.org.
155. SMA - Screen Manufacturers Association; www.smainfo.org.
156. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
157. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
158. SPIB - Southern Pine Inspection Bureau; www.spib.org.
159. SPRI - Single Ply Roofing Industry; www.spri.org.
160. SRCC - Solar Rating & Certification Corporation; www.solar-rating.org.
161. SSINA - Specialty Steel Industry of North America; www.ssina.com.
162. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
163. STI - Steel Tank Institute; www.steeltank.com.
164. SWI - Steel Window Institute; www.steelwindows.com.
165. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
166. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
167. TCNA - Tile Council of North America, Inc.; www.tileusa.com.
168. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
169. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
170. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
171. TMS - The Masonry Society; www.masonrysociety.org.
172. TPI - Truss Plate Institute; www.tpinst.org.
173. TRI - Tile Roofing Institute; www.tileroofing.org.
174. UL - Underwriters Laboratories Inc.; http://www.ul.com.
175. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
176. USGBC - U.S. Green Building Council; www.usgbc.org.
177. WA - Wallcoverings Association; www.wallcoverings.org
178. WASTEC - Waste Equipment Technology Association; www.wastec.org.
179. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
180. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
181. WDMA - Window & Door Manufacturers Association; www.wdma.com.
182. WI - Woodwork Institute; www.wicnet.org.
183. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
184. WWPA - Western Wood Products Association; www.wwpa.org.

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.
   1. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
   2. ICC - International Code Council; www.iccsafe.org.
   3. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

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

   1. COE - Army Corps of Engineers; www.usace.army.mil.
   2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.

3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
4. DOD - Department of Defense; www.quicksearch.dla.mil.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FAA - Federal Aviation Administration; www.faa.gov.
8. FG - Federal Government Publications; www.gpo.gov/fdsys.
9. GSA - General Services Administration; www.gsa.gov.
10. HUD - Department of Housing and Urban Development; www.hud.gov.
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eetd.lbl.gov.
12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
13. SD - Department of State; www.state.gov.
14. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.
15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
17. USDOJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
18. USP - U.S. Pharmacopeial Convention; www.usp.org.
19. USPS - United States Postal Service; www.usps.com.

E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.
3. DSCC - Defense Supply Center Columbus; (See FS).
4. FED-STD - Federal Standard; (See FS).
5. FS - Federal Specification; Available from DLA Document Services; www.quicksearch.dla.mil.

    a. Available from Defense Standardization Program; www.dsp.dla.mil.
    b. Available from General Services Administration; www.gsa.gov.
    c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.

6. MILSPEC - Military Specification and Standards; (See DOD).
7. USAB - United States Access Board; www.access-board.gov.
8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

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

1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
3. CDHS; California Department of Health Services; (See CDPH).
4. CDPH; California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
5. CPUC; California Public Utilities Commission; www.cpuc.ca.gov.
6. SCAQMD; South Coast Air Quality Management District; www.aqmd.gov.
7. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; www.txforestservice.tamu.edu.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 00

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:

1. Section 01 10 00 "Summary" for work restrictions and limitations on utility interruptions.
2. Section 31 20 00 "Earth Moving" for disposal of ground water at Project site.

1.3 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.

B. Sewer Service: Pay sewer-service use charges for sewer usage by all entities for construction operations.

C. Water Service: Pay water-service use charges for water used by all entities for construction operations.

D. Electric Power Service: Pay electric-power-service use charges for electricity used by all entities for construction operations.

E. 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.

F. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.4 INFORMATIONAL SUBMITTALS

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

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.

1.5 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

C. Accessible Temporary Egress: Comply with applicable provisions in the United States Access Board's ADA-ABA Accessibility Guidelines.

1.6 PROJECT CONDITIONS

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

PART 2 - PRODUCTS

2.1 MATERIALS

A. Chain-Link Fencing: Minimum 2-inch, 0.148-inch-thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch-OD line posts and 2-7/8-inch-OD corner and pull posts, with 1-5/8-inch-OD top rails.

B. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch-thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch-OD line posts and 2-7/8-inch-OD corner and pull posts, with 1-5/8-inch-OD top and bottom rails. Provide galvanized-steel bases for supporting posts.

2.2 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1. Store combustible materials apart from building.

2.3 EQUIPMENT

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

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction and marked for intended location and application.

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 01 10 00 "Summary."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 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.

1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

E. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.

F. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

1. Install electric power service overhead unless otherwise indicated.

G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

H. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install Wi-Fi cell phone access equipment for each field office.

I. Electronic Communication Service: Provide a desktop computer in the primary field office adequate for use by Architect and Owner to access Project electronic documents and maintain electronic communications. Equip computer with not less than the following:

1. Processor: Intel Core i5 or i7.
2. Memory: 4 gigabyte.
3. Disk Storage: 500 gigabyte hard-disk drive and combination DVD-RW/CD-RW drive.
4. Display: 24-inch LCD monitor with 256-Mb dedicated video RAM.
5. Full-size keyboard and mouse.
6. Network Connectivity: 10/100BaseT Ethernet.
7. Operating System: latest Microsoft Windows.
8. Productivity Software:

    a. Microsoft Office Professional, 2010 or higher, including Word, Excel, and Outlook.
    b. Adobe Reader 11.0 or higher.
    c. WinZip 7.0 or higher.

9. Printer: "All-in-one" unit equipped with printer server, combining color printing, photocopying, scanning, and faxing, or separate units for each of these three functions.
10. Internet Service: Broadband modem, router and ISP, equipped with hardware firewall, providing minimum 1.0 Mbps upload and 15 Mbps download speeds at each computer.
11. Internet Security: Integrated software, providing software firewall, virus, spyware, phishing, and spam protection in a combined application.
12. Backup: External hard drive, minimum 2 terabyte, with automated backup software providing daily backups.

3.4 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Use of Planned Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Section 31 20 00 "Earth Moving."
3. Recondition base after temporary use, including removing contaminated material, regrading, proof rolling, compacting, and testing.
4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Section 32 12 16 "Asphalt Paving."

C. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

D. Parking: Provide temporary parking areas for construction personnel.

E. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

F. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Identification Signs: Provide Project identification signs as indicated on Drawings.
2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

    a. Provide temporary, directional signs for construction personnel and visitors.

3. Maintain and touch up signs so they are legible at all times.

G. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 01 73 00 "Execution."

H. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

I. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.

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. 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 01 10 00 "Summary."

B. Temporary Erosion and Sedimentation Control: Comply with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent, and requirements specified in Section 31 10 00 "Site Clearing."

C. 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.

D. Tree and Plant Protection: Comply with requirements specified in Section 01 56 39 "Temporary Tree and Plant Protection."

E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

F. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.

G. Site Enclosure Fence: Before construction operations begin] [Prior to commencing earthwork, 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. Furnish one set of keys to Owner.

H. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.

I. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

J. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

K. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed, and permanent enclosure is incomplete, insulate temporary enclosures.

L. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.

1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.6 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture-Protection Plan: 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 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.

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 or permanent HVAC 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.

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 01 77 00 "Closeout Procedures."

END OF SECTION 01 50 00

SECTION 01 56 39 - TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Perform operations required to verify tree protection status, protect and maintain trees and tree protection elements that are in place at the beginning of the contract. Work includes:
    a. Tagging of existing trees to be protected.
    b. Protection of existing trees.
    c. Maintenance of installed tree protection elements.
    d. Pruning of existing trees to be protected.
2. Related Sections:
    a. Section 01 50 00 - Temporary Facilities and Controls
    b. Section 31 10 00 - Site Preparation
    c. Section 31 22 00 - Earthwork

1.3 DEFINITIONS

A. The Critical Root Zone (CRZ) of a tree is described as an area equal to 1-foot radius for every inch diameter of a tree at breast height.

1.4 ACTION SUBMITTALS

A. Submit in accordance with Sections 013310, Submittal Procedures, 013323, Shop Drawings, Product Data and Samples, and the following:

1. Schedule and Work Plan: Submit detailed schedule and work plan for each part of the work.
2. Product Data: For each type of product indicated.
3. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
4. Damage to Existing Features: It shall be the Contractor’s responsibility to inform the Owner in writing of any existing plant material that is damaged. Failure to take this precaution shall make the Contractor liable for replacement at his own expense.

5. Certification: From a qualified arborist that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.
6. Maintenance Recommendations: From a qualified arborist for care and protection of trees affected by construction during and after completing the Work.

1.5 QUALITY ASSURANCE

A. Tree Protection Limits: Areas requiring tree protection, as indicated on the plans, or within the Critical Root Zone (CRZ).
   1. Notify the Owner before undertaking any work within tree protection limits. Owner may elect to have arborist work within tree protection area completed by Owner.
   2. Flagging of Existing Trees: Flag trees to remain with a bright colored ribbon. Notify the Owner to verify all trees that are flagged.
   3. Preinstallation Conference: Before starting tree protection and trimming, meet with Owner, and other concerned entities. Review tree protection and trimming procedures and responsibilities.

B. Tree Service Qualifications: An experienced tree service firm that has successfully completed tree protection and trimming work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site on a full-time basis during execution of the Work.

C. Arborist Qualifications: An arborist certified by the International Society of Arboriculture or licensed in the jurisdiction where Project is located.

D. Tree Pruning Standards: Comply with ANSI A300, "Trees, Shrubs, and Other Woody Plant Maintenance--Standard Practices," unless more stringent requirements are indicated.

PART 2 - PRODUCTS

2.1 TREE PROTECTION FENCING

A. Standard Fencing:
   1. Chain link fence materials including posts, braces, and mesh may be salvaged materials from site or other used material to form a 6-foot high enclosure.
   2. Posts: Minimum 1-1/2” steel pipe.
   3. Mesh: 2” x 2” x 11 ga. min. chain link fabric.

2.2 MISCELLANEOUS MATERIALS

A. Water used for tree watering shall be potable water supplied by the Contractor.

PART 3 - EXECUTION

3.1 PREPARATION

A. Flagging of Existing Trees: Flag trees to remain with a bright colored ribbon. Notify the Owner at least 48 hours prior to commencing of work to verify all trees that are flagged.

B. Temporary Fencing: Install temporary fencing located as indicated or outside the drip line of trees to protect remaining vegetation from construction damage. Install fencing before site preparation, grading, clearing, and grubbing operations.

C. Restrict foot and vehicular traffic over root zone to prevent excessive compaction of soil.

D. Protect tree root systems from damage due to noxious materials caused by runoff or spillage while mixing, placing, or storing construction materials. Protect root systems from flooding, eroding, or excessive wetting caused by dewatering operations.

E. Do not store construction materials, debris, or excavated material within the drip line of remaining trees. Do not permit vehicles or foot traffic within the drip line; prevent soil compaction over root systems.

3.2 EXCAVATION

A. Install shoring or other protective support systems to minimize sloping or benching of excavations.

B. Do not excavate within root zone of trees, unless otherwise indicated.

C. Where excavation for new construction is required within root zone of trees, hand clear and excavate to minimize damage to root systems. The root protection zone is assumed to be the same as the critical root zone. Use narrow-tine spading forks and comb soil to expose roots.

1. Relocate roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and relocate them without breaking. Do not cut main lateral roots or tap roots. If encountered immediately adjacent to location of new construction and relocation is not practical, cut roots approximately 3 inches back from new construction. The Contractor shall notify the Owner prior to cutting roots over 6” in diameter. Roots up to and including 3/4” shall be cut by hand pruners. Roots above 3/4” shall be cut by hand saws.
2. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

D. Where utility trenches are required within drip line of trees, tunnel under or around roots by drilling, auger boring, pipe jacking, or digging by hand.

1. Root Pruning: Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots with sharp pruning instruments; do not break or chop.

3.3 TREE PRUNING

A. Owner to approve any removal of branches from existing trees. Contractor to request any removal of branches in writing at least two weeks before the planned work. In general, branches of existing trees are to be preserved and protected.

B. In the event that the Owner approves removal of branches by Contractor, the Contractor shall engage a qualified tree surgeon to remove branches from trees.

C. Prune remaining trees to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by qualified arborist.

D. Pruning Standards: Prune trees according to ANSI A300.

E. Cut branches with sharp pruning instruments; do not break or chop.

F. Chip branches removed from trees. Spread chips where indicated or as directed by Architect.

3.4 TREE REPAIR AND REPLACEMENT

A. Promptly repair trees damaged by construction operations within 24 hours. Treat damaged trunks, limbs, and roots according to written instructions of the qualified arborist.

B. Remove and replace dead and damaged trees that the qualified arborist determines to be incapable of restoring to a normal growth pattern.

1. Provide new trees of the same size and species as those being replaced; plant and maintain as specified.

C. Remove any damaged and destroyed trees from the site. Grub stumps and repair the ground surface. All costs shall be borne by the Contractor.

3.5 DISPOSAL OF WASTE MATERIALS

A. Burning is not permitted.

B. Revise below when disposal of some or all materials to designated site storage areas is permitted.

C. Concrete: Disposal: Remove excess excavated material, displaced trees, and excess chips from Owner's property.

END OF SECTION 01 56 39

SECTION 01 57 13 - TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section includes but is not limited to the implementation and maintenance of a comprehensive erosion control plan that complies with the City of North Bend Public Works Standards. The contractor is responsible for implementing Best Management Practices (BMP's) in accordance with the City of North Bend requirements. The information provided on the contract plans should be considered a minimum for the anticipated construction and conditions. The contractor shall be responsible for adding additional BMP's as conditions change at no additional cost to the owner. The Contractor shall coordinate installation and inspections of the BMP's with the City of North Bend Site Inspector. Additional BMP's shall be stockpiled on site as requested by the Clearing and Grading Inspector.

B. This Section includes the following:

1. Silt Control Measures.
2. Temporary Stormwater Runoff Control.
3. Measures to keep streets and site pavements clean.
4. P.E. sheeting cover for exposed soil.
5. Maintaining, monitoring, and supplementing silt control, storm water runoff control measures and additional BMP's as required by the City of North Bend and other local jurisdictions.
6. Related Sections: The following Sections contain requirements that relate to this Section:

   Section 31 10 00 – Site Preparation
   Section 31 22 00 – Earthwork

1.3 REFERENCES

A. WSDOT Standard Specifications Washington State Department of Transportation 2024 Standard Specifications for Road, Bridge, and Municipal Construction.

B. City of North Bend Public Works Standards, June 2018.

C. King County Surface Water Design Manual, 2021.

D. City of North Bend Clearing, Grading, Filling, and Drainage Code, Chapter 19.10.

E. Geotechnical Engineering Report prepared by Associated Earth Sciences, Inc for Two Rivers Montessori School Additions, dated April 11, 2023.

1.4 SUBMITTALS

A. Product Submittals: Product catalog cuts for silt fence and silt-sac inserts. Aggregate Materials: Coarse aggregate for gravel construction entrance and emergency overflow spillway.

1.5 REGULATORY REQUIREMENTS

A. Work to comply with City of North Bend Public Works Standards. The Contractor shall coordinate with the City of North Bend Site Inspector.

1.6 SEQUENCING AND SCHEDULING

A. Install erosion control measures in work areas prior to any clearing, grubbing, demolition, general site grading, or other construction in the area. Erosion control items shall be installed and removed at various times throughout the duration of the project.

1.7 MAINTENANCE

A. Maintain erosion control through the duration of the project.

B. Maintain erosion control after substantial completion per this section.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Filter Fabric Fence: In accordance with WSDOT Standard Specifications Section 9-33, Permanent Erosion Control, High Serviceability, Class B.

B. Straw Mulching:In accordance with WSDOT Standard Specifications Section 9-14.5(1).

C. Filter Fabric: Mirifi 140N or equal.

D. Filter Bag Inserts (Inlet Protection): Commercially manufactured filter bags specifically manufactured for silt filtering, and which will provide filtering performance required. Contractor to verify current standards with the City of North Bend Inspector.

E. Straw Wattles: In accordance with WSDOT Standard Specifications Section 9-14.6(5).

F. Stabilized Construction Access: Quarry Spalls shall be 2” Ballast per WSDOT Standard Specifications Section 9-03.9(1) and Geotechnical Fabric below shall be Mirafi 500X or approved equal.

G. Gravel Haul Road for Construction Access: Shall be Crushed Surfacing Base Course per WSDOT Standards Specifications Section 9-03.9(3) and Geotechnical Fabric below shall be Mirafi 500X or approved equal.

H. Sump and Pump Facilities:

1. Sump shall be per plans.
2. Filter fabric shall be Mirafi 160N or approved equal.
3. Sump pump shall be designed and sized by Contractor to manage construction stormwater routed to sump. Contractor shall meet all requirements in project specifications section 312200(1.5) Dewatering.
4. Gravel shall be washed rock per project specifications section 31 22 00.

PART 3 - EXECUTION

3.1 TESC FACILITIES

A. The implementation of the Erosion Control system and the maintenance, replacement and upgrading of these facilities is the responsibility of the Contractor until all construction is approved. The Temporary Erosion and Sediment Control (TESC) facilities must be maintained in conjunction with all clearing and grading activities, and in such a manner as to ensure that sediment laden water does not enter the drainage system or violate applicable water standards in accordance with the City of North Bend requirements and the contract documents.

B. The TESC facilities shown on the plans are the minimum requirements for anticipated site conditions. During the construction period, the erosion control facilities installed may require maintenance, relocation or upgrading (e.g., additional wattles, relocation of adjustment of silt fences, replacement of inlet protection, etc.) as shown on the plans or as needed. Contractor shall pay for all costs associated with the construction, maintenance, upgrading and removal of the erosion control system throughout project duration.

C. Adequate temporary and permanent control of surface water runoff and subsurface seepage will be required in order to allow site access, grading, and construction of underground utilities to proceed. Site preparation and initial construction activities should be planned to minimize disturbance to the existing ground surface particularly during extended wet weather periods when the presence of excess moisture will render the site soils more prone to disturbance. During wet site conditions, equipment traffic should not be allowed on exposed subgrade areas. Erosion of the soil will occur as exposed surfaces are disturbed due to construction activity and exposure to climatic conditions. The Contractor shall be responsible for protecting disturbed or prepared surfaces by some form of weather cover if left exposed for more than 2 days. Contractor shall also protect disturbed or prepared surfaces from surface ponding, storm water runoff, and construction traffic. The Contractor will be solely responsible for any repairs required to these surfaces at no additional cost to the owner.

D. Access Streets, Drives, and Roadways: Provide wheel cleaning stations to clean wheels and undercarriage of trucks before leaving site, as necessary to prevent dirt from being carried onto public streets. If streets are fouled, clean immediately in conformance with City of North Bend and all governing requirements and regulations.

3.2 NPDES PERMIT

A. The Project is not required to submit for a Construction Stormwater General Permit (NPDES) with the Department of Ecology and the project disturbed area is less than 1.0 acre.

3.3 TURBIDITY MONITORING

A. The contractor shall be responsible for meeting turbidity requirements as stated within the Turbidity Monitoring Report. Additional TESC measures may be required to achieve discharge requirements. The contractor shall be responsible for providing additional measures as work progresses to meet turbidity requirements.

3.4 PH MONITORING

A. On-site erosion control inspections and pH monitoring shall be performed in accordance with DOE requirements. pH monitoring report shall be part of the weekly construction team meetings. Temporary and permanent erosion control and drainage measures shall be adjusted and maintained as necessary.

B. The Contractor shall be responsible for meeting the DOE pH requirements. A pH monitoring Plan shall be the responsibility of the Contractor to prepare and maintain. Additional measures may be required to achieve pH discharge requirements of between 6.5 and 8.0. These measures shall be at no additional expense to the North Bend School District.

C. Sampling and monitoring for pH will occur for the duration of the work with special attention during demolition of concrete work or concrete structures until it is removed from the site, during and following the use of any cement treatment for soil stabilization until covered, as well as, in the stage of construction when concrete pouring will be conducted until fully cured (3 weeks from pour). Samples will be analyzed for pH using a calibrated pH meter and recorded in the site log book.

D. The key benchmark pH value for stormwater is a maximum of 8.0. If a pH greater than 8.0 is measured in the sedimentation pond or detention vault used for sediment settling, the following steps will be conducted:

1. Assess whether additional BMPs should be implemented and whether associated revisions to the SWPPP are necessary.
2. Stop (detain) all discharges from leaving the site and entering surface waters or storm drains if the pH is greater than 8.5.
3. Collect sample from sedimentation pond and/or temporary tanks used for settling the following day, and if the pH exceeds 8.0 for the second consecutive day, implement CO_2 sparging treatment.

4. Sample and measure pH daily until there are 3 consecutive pH measurements less than 8.0.
5. If there are 3 consecutive pH measurements greater than 8.0, notify Ecology by phone within 24 hours of the 3rd measurement exceeding a pH of 8.0 (contact the Northwest Regional Office at 425-649-7000) and initiate discussions with Ecology regarding additional treatment BMPs.
6. Describe inspection results and remedial actions that are taken in the site log book and in monthly discharge monitoring reports.

E. If during construction, the monitoring reports show that the PH threshold of greater than 8.0 has been exceeded, the Contractor shall take immediate corrective action to bring the threshold within compliance. The Contractor shall pay for all additional testing required beyond the weekly testing to bring the site into compliance.

3.5 DRAINAGE COLLECTION AND CONVEYANCE

A. Surface runoff and discharge shall always be controlled during and following development. Additional measures to control runoff may be required, which shall be at no additional expense to Mukilteo School District. Under no circumstances shall the contractor allow concentrated discharges over slopes.

B. The plan locations of temporary interceptor swales are schematic. Field adjust, move, and reconstruct as necessary during construction to maintain drainage to sediment facilities and to allow construction of improvements to proceed. Provide rock check dams per the drawings.

C. Provide additional culverts beyond those indicated on plans as required to maintain unobstructed conveyance of surface flows to sediment traps and sediment storage facilities throughout grading operations.

D. Additional collection structures shall be installed as necessitated by land clearing activities to ensure that sediment laden water does not enter the natural or public drainage system.

E. Storm drains shall be installed in accordance with Section 33 40 00.

3.6 EXAMINATION

A. Verify locations of existing catch basins and related storm drainage features that may be impacted by construction activities.

3.7 PREPARATION

A. Locate existing utilities, avoid damage or disturbance. For aid in utility location call "Dial Dig 1-800-424-5555," OR “8-1-1” 48 hours (two working days) or a private locate service (for private property) prior to beginning construction. Provide and pay for additional marking as required.

B. Survey limits of work to install silt fence.

C. Perform clearing or other work required to installing erosion control.

3.8 CONSTRUCTION

A. Filter Fabric Fence:

1. Field adjust location to perimeter of clearing and stripping. Location shown on drawings is schematic. Cast all trench excavation soils from fence installation to the Construction side of fence. Overlap filter fabric fence joints minimum 1 foot prior to backfilling trench.

B. Polyethylene Sheeting:

1. Overlap joints minimum 28 inches. Overlap in direction of drainage and prevent water from draining onto material being protected. Secure in place to prevent movement and damage. Provide sandbags at 2.5 feet spacing and tie the sandbags together with rope on slopes greater than 3:1. Minimize driving stakes through plastic.

C. Mulch:

1. Mulch exposed soils not protected by other means. Provide continuous covering minimum depth 3 inches. Apply mulch with tackifier to prevent blowing.

D. Stabilized Construction Access:

1. Install as shown on the plans. The access(es) shall be installed at the beginning of construction and maintained to meet applicable standards for the duration of the project. Additional measures may be required to ensure that all paved areas are kept clean for the duration of the project.
2. Install stabilizing geotextile, Mirafi 500x or equal, with a minimum 12” overlap at each joint. Extend geotextile 24” beyond limits of construction access.
3. Place quarry spall material to a minimum compacted depth of 12 inches.

3.9 ADJUSTMENTS AND REVISIONS

A. Adjust or move TESC measures as necessary during construction to direct site runoff to catch basins with silt filters inserted.

3.10 PROTECTION AND MAINTENANCE

A. Protection:

1. Where possible, maintain natural vegetation for silt control.
2. Prevent silt-laden water from leaving site or from entering off-site storm sewer systems.
3. All slopes, cut, or fill areas where Work has stopped for more than 30 days shall be stabilized by mulching, polyethylene sheeting or other method to prevent erosion and sediment transport.

4. Keep all off-site parking areas, streets, and sidewalks clean from construction debris on a daily basis while school is in session. Paved surfaces shall be kept clean by the use of mechanical sweeping equipment, hand shovels and brooms or other accepted methods suitable of removing dirt, rock, silt and sand. No street washing will be allowed.

B. Supplementary measures:

1. Provide additional silt control and temporary erosion control measures as required to protect soils and prevent silt laden runoff from leaving project site at no additional cost to the owner.

C. Maintenance:

1. Monitor and maintain silt control measures. Remove accumulations of sediment when more than 50 percent of silt storage capacity is filled. Maintain all temporary erosion control facilities until need for each facility has been superseded by other stabilization methods or until Owner authorizes removal.
2. Inspect and repair temporary erosion control facilities. Inspect the entire system to ensure proper operation a minimum of once per week, during and after storms, and prior to weekends and holidays.

END OF SECTION 01 57 13

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:
   1. Section 01 25 00 "Substitution Procedures" for requests for substitutions.
   2. Section 01 42 00 "References" for applicable industry standards for products specified.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

   1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
   2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
   3. Comparable Product: Product that is demonstrated and approved by Architect through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.

C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual

Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications. Submit a comparable product request, if applicable.

1.4 ACTION SUBMITTALS

A. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify basis-of-design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

    a. Form of Architect's Approval of Submittal: As specified in Section 01 33 00 "Submittal Procedures."
    b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 01 33 00 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

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-connected 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 identification requirements.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

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

B. Delivery and Handling:

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

C. Storage:

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

1.7 PRODUCT WARRANTIES

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

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

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

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

C. Submittal Time: Comply with requirements in Section 01 77 00 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

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

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties 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: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

a. Submit additional documentation required by Architect in order to establish equivalency of proposed products. Evaluation of "or equal" product status is by the Architect, whose determination is final.

B. Product Selection Procedures:

1. Sole 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. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
    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, which 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: …"

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. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
    a. Limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, provide products by one of the following: …"

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, which complies with requirements.
    a. Non-limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following: …"

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 indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

a. For approval of products by unnamed manufacturers, comply with requirements in Section 01 25 00 "Substitution Procedures" for substitutions for convenience.

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

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 25 00 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
2. Evidence that proposed product provides specified warranty.
3. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
4. Samples, if requested.

B. Submittal Requirements: Approval by the Architect of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 60 00

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Coordination of Owner-installed products.
6. Progress cleaning.
7. Starting and adjusting.
8. Protection of installed construction.

B. Related Requirements:

1. Section 01 10 00 "Summary" for limits on use of Project site.
2. Section 01 33 00 "Submittal Procedures" for submitting surveys.
3. Section 01 77 00 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For land surveyor and professional engineer.

B. Certificates: Submit certificate signed by land surveyor and professional engineer certifying that location and elevation of improvements comply with requirements.

C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

D. Certified Surveys: Submit two copies signed by land surveyor.

E. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

1.4 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services; and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.

2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

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

3.2 PREPARATION

A. Existing Utility Information: Furnish information to 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 caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 01 31 00 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish limits on use of Project site.
3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.

4. Inform installers of lines and levels to which they must comply.
5. Check the location, level and plumb, of every major element as the Work progresses.
6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

A. Identification: Owner will identify existing benchmarks, control points, and property corners.

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

1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

E. Final Property Survey: Engage a land surveyor to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.

1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
2. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.

2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Repair or remove and replace damaged, defective, or nonconforming Work.

1. Comply with Section 01 77 00 "Closeout Procedures" for repairing or removing and replacing defective Work.

3.6 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with 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. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
b. Restore damaged pipe covering to its original condition.

F. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction personnel.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.8 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

    a. Use containers intended for holding waste materials of type to be stored.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 50 00 "Temporary Facilities and Controls."

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.9 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 01 40 00 "Quality Requirements."

3.10 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.

C. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01 73 00

SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Salvaging nonhazardous demolition and/or construction waste.
2. Recycling nonhazardous demolition and/or construction waste.
3. Disposing of nonhazardous demolition and/or construction waste.

B. Related Requirements:
1. Section 31 10 00 "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

1.3 DEFINITIONS

A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.

C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner’s property.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 MATERIALS OWNERSHIP

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

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan within 30 days of date established for the Notice to Proceed

1.6 INFORMATIONAL SUBMITTALS

A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Use Owner's form designation. Include the following information:

1. Material category.
2. Generation point of waste.
3. Total quantity of waste in tons.
4. Quantity of waste salvaged, both estimated and actual in tons.
5. Quantity of waste recycled, both estimated and actual in tons.
6. Total quantity of waste recovered (salvaged plus recycled) in tons.
7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.

C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.

D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.

E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

G. Qualification Data: For waste management coordinator.

1.7 QUALITY ASSURANCE

A. Waste Management Coordinator Qualifications: Experienced firm, or individual employed and assigned by General Contractor, with a record of successful waste management coordination of projects with similar requirements. Superintendent may serve as Waste Management Coordinator.

B. Regulatory Requirements: Comply with transportation and disposal regulations of authorities having jurisdiction.

C. Waste Management Conference(s): Conduct conference(s) at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:

1. Review and discuss waste management plan including responsibilities of each contractor and waste management coordinator.
2. Review requirements for documenting quantities of each type of waste and its disposition.
3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
5. Review waste management requirements for each trade.

1.8 WASTE MANAGEMENT PLAN

A. General: Develop a waste management plan according to requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume but use same units of measure throughout waste management plan.

B. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing and construction waste generated by the Work. Use Owner's form designation. Include estimated quantities and assumptions for estimates.

C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Use Owner's form designation. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work in compliance with Section 02 41 19 "Selective Demolition."
2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.

4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

D. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there were no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Use Owner's form designation. Include the following:

1. Total quantity of waste.
2. Estimated cost of disposal (cost per unit). Include transportation and tipping fees and cost of collection containers and handling for each type of waste.
3. Total cost of disposal (with no waste management).
4. Revenue from salvaged materials.
5. Revenue from recycled materials.
6. Savings in transportation and tipping fees by donating materials.
7. Savings in transportation and tipping fees that are avoided.
8. Handling and transportation costs. Include cost of collection containers for each type of waste.
9. Net additional cost or net savings from waste management plan.

PART 2 - PRODUCTS

2.1 RECYCLING RECEIVERS AND PROCESSORS

A. Subject to compliance with requirements, available recycling receivers and processors include, but are not limited to, the following:

1. King County Solid Waste.

2.2 PERFORMANCE REQUIREMENTS

A. General: Achieve end-of-Project rates for salvage/recycling of 50 percent by weight of total nonhazardous 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. Asphalt paving.
b. Concrete.
c. Concrete reinforcing steel.

2. Construction Waste:

a. Lumber.
b. Wood sheet materials.
c. Metals.
d. Roofing.
e. Insulation.
f. Gypsum board.
g. Piping.
h. Electrical conduit.
i. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph 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) Wood pallets.
8) Plastic pails.

j. Construction Office Waste: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following construction office waste materials:

1) Paper.
2) Aluminum cans.
3) Glass containers.

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

1. Comply with operation, termination, and removal requirements in Section 01 50 00 "Temporary Facilities and Controls."

B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.

1. Distribute waste management plan to everyone concerned within three days of submittal return.

2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged and recycled.
2. Comply with Section 01 50 00 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

A. Comply with requirements in Section 02 41 19 "Selective Demolition" for salvaging demolition waste.

B. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
3. Store items in a secure area until installation.
4. Protect items from damage during transport and storage.
5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

C. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area on-site.
5. Protect items from damage during transport and storage.

D. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.

E. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.

F. Plumbing Fixtures: Separate by type and size.

G. Lighting Fixtures: Separate lamps by type and protect from breakage.

H. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.

C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.

1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

    a. Inspect containers and bins for contamination and remove contaminated materials if found.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor as often as required to prevent overfilling bins.

3.4 RECYCLING DEMOLITION WASTE

A. Asphalt Paving: Grind asphalt to maximum size per recycling facility and per civil specification.

1. Crush asphaltic concrete paving and screen to comply with requirements in Section 31 20 00 "Earth Moving" for use as general fill.

B. Asphalt Paving: Break up and transport paving to asphalt-recycling facility.

C. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
1. Pulverize concrete to maximum size per recycling facility and per civil specifications.
2. Crush concrete and screen to comply with requirements in Section 31 20 00 "Earth Moving" for use as satisfactory soil for fill or subbase.

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. Piping: Reduce piping to straight lengths and store by material and size. Separate supports, hangers, valves, sprinklers, and other components by material and size.

H. Conduit: Reduce conduit to straight lengths and store by material and size.

I. Lamps: Separate lamps by type and store according to requirements in 40 CFR 273.

3.5 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. 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.

C. Paint: Seal containers and store by type.

3.6 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged or recycled, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. General: Except for items or materials to be salvaged or recycled, remove waste materials and legally dispose of at designated spoil areas on Owner’s property.

C. Burning: Do not burn waste materials.

D. Burning: Burning of waste materials is permitted only at designated areas on Owner's property, provided required permits are obtained. Provide full-time monitoring for burning materials until fires are extinguished.

END OF SECTION 01 74 19

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
   1. Substantial Completion procedures.
   2. Final completion procedures.
   3. Warranties.
   4. Repair of the Work.
   5. Final cleaning.

B. Related Requirements:
   1. Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
   2. Section "Execution" for progress cleaning of Project site.
   3. Section 01 32 33 "Photographic Documentation" for submitting final completion construction photographic documentation.
   4. Section 01 78 23 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
   5. Section 01 78 39 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
   6. Section 01 79 00 "Demonstration and Training" for requirements to train the Owner's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.
   7. Divisions 02 through 49 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

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.

C. Field Report: For pest control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in 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 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.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 01 79 00 "Demonstration and Training."
6. Advise Owner of changeover in 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 according to Section 01 29 00 "Payment Procedures."
   2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
   3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
   4. Submit pest-control final inspection report.
   5. Submit final completion photographic documentation.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection

and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

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

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

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

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.

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 uploading to web-based project software site.

E. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

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

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
    a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
    d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    e. Remove snow and ice to provide safe access to building.

f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.

h. Sweep concrete floors broom clean in unoccupied spaces.

i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.

j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.

k. Remove labels that are not permanent.

l. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.

1) Clean HVAC system in compliance with Section 23 01 30.52 "Existing HVAC Air-Distribution System Cleaning." Provide written report on completion of cleaning.

p. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.

q. Leave Project clean and ready for occupancy.

C. Pest Control: Comply with pest control requirements in Section 01 50 00 "Temporary Facilities and Controls." Prepare written report.

D. Construction Waste Disposal: Comply with waste disposal requirements in Section 01 50 00 "Temporary Facilities and Controls." and Section 01 74 19 "Construction Waste Management and Disposal."

E. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

    a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 01 77 00

SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory manuals.
2. Emergency manuals.
3. Systems and equipment operation manuals.
4. Systems and equipment maintenance manuals.
5. Product maintenance manuals.

B. Related Requirements:

1. Section 01 33 00 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
2. Section 01 91 13 "General Commissioning Requirements" for verification and compilation of data into operation and maintenance manuals.

1.3 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.

1.4 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 on digital media acceptable 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.

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 01 77 00 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.5 FORMAT OF OPERATION AND MAINTENANCE MANUALS

A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

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

B. Manuals, Paper Copy: Submit manuals in the form of hard-copy, bound and labeled volumes.

1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name and subject matter of contents. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and

major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.

3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment. Enclose title pages and directories in clear plastic sleeves.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
    a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

1.6 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Architect.
7. Name and contact information for Commissioning Authority.
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.

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."

1.7 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.

1.8 EMERGENCY MANUALS

A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

B. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

C. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

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

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

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

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.

4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

1.9 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:

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.

1.10 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.

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.

1.11 PRODUCT MAINTENANCE MANUALS

A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

E. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 78 23

SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.
4. Miscellaneous record submittals.

B. Related Requirements:
1. Section 01 73 00 "Execution" for final property survey.
2. Section 01 77 00 "Closeout Procedures" for general closeout procedures.
3. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:
1. Number of Copies: Submit copies of record Drawings as follows:

a. Initial Submittal:
1) Submit record digital data files and one set of plots.

b. Final Submittal:
1) Submit record digital data files and three sets of record digital data file plots.
2) Plot each drawing file, whether or not changes and additional information were recorded.

B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.

E. Reports: Submit written report weekly indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

1.4 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 sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:

1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
3. Refer instances of uncertainty to Architect for resolution.
4. Architect will furnish Contractor with one set of digital data files of the Contract Drawings for use in recording information.

    a. See Section 01 31 00 "Project Management and Coordination" for requirements related to use of Architect's digital data files.
    b. Architect will provide data file layer information. Record markups in separate layers.

C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize record prints 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.

1.5 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. Note related Change Orders and record Drawings where applicable.

B. Format: Submit record Specifications as annotated PDF electronic file.

1.6 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.

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

PART 3 - EXECUTION

END OF SECTION 01 78 39

SECTION 01 79 00 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Instruction in operation and maintenance of systems, subsystems, and equipment.
2. Demonstration and training video recordings.

A. Related Sections include the following:

1. Division 01 Section "Project Management and Coordination" for requirements for pre-instruction conferences.

2. Divisions 02 through 49 Sections for specific requirements for demonstration and training for products in those Sections.

1.3 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.

1.4 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:

    a. Name of Project.
    b. Name and address of videographer.
    c. Name of Architect.
    d. Name of Construction Manager.
    e. Name of Contractor.
    f. Date of video recording.

2. Transcript: Prepared and bound in format matching operation and maintenance manuals. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding video recording. Include name of Project and date of video recording on each page.
3. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
4. At completion of training, submit complete training manual(s) for Owner's use prepared in same format required for operation and maintenance manuals specified in Section 01 78 23 "Operation and Maintenance Data."

1.5 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 01 40 00 "Quality Requirements," experienced in operation and maintenance procedures and training.

1.6 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.

1.7 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

   a. System, subsystem, and equipment descriptions.
   b. Performance and design criteria if Contractor is delegated design responsibility.
   c. Operating standards.
   d. Regulatory requirements.
   e. Equipment function.
   f. Operating characteristics.
   g. Limiting conditions.
   h. Performance curves.

2. Documentation: Review the following items in detail:

   a. Emergency manuals.
   b. 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.
   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.

1.8 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 01 78 23 "Operation and Maintenance Data."

B. Set up instructional equipment at instruction location.

1.9 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 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 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.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 01 79 00

SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.
3. Salvage of existing items to be reused or recycled

B. Related Requirements:

1. Section 01 10 00 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Section 01 56 39 "Temporary Tree and Plant Protection" for temporary protection of existing trees and plants that are affected by selective demolition.
3. Section 01 73 00 "Execution" for cutting and patching procedures.
4. Section 01 35 16 "Alteration Project Procedures" for general protection and work procedures for alteration projects.

1.3 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 store or deliver to Owner ready for reuse per drawings.

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.

1.4 MATERIALS OWNERSHIP

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

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 PREINSTALLATION MEETINGS

A. Pre-demolition Meeting: Conduct pre-demolition meeting as part of general construction meeting or separately as necessary.

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review structural load limitations of existing structure.
3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
5. Review areas where existing construction is to remain and requires protection.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For refrigerant recovery technician.

B. Engineering Survey: Submit engineering survey of condition of building.

C. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property for environmental protection, for dust control and for noise control. Indicate proposed locations and construction of barriers.

D. Schedule of Selective Demolition Activities - Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's and tenants' on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Use of elevator and stairs.
5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

E. Pre-demolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused

by demolition operations. Comply with Section 01 32 33 "Photographic Documentation." Submit before Work begins.

F. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

G. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.7 CLOSEOUT SUBMITTALS

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

1.8 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.9 FIELD CONDITIONS

A. Drawings of existing conditions are for Contractor’s general reference. Examine existing site conditions and accept them “as-is”.

B. Conduct demolition to minimize interference with adjacent surfaces and improvements.

C. Keep active building systems and utilities intact and in continuous operation.

D. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

E. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

F. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

G. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. Hazardous materials will be removed by Owner before start of the Work.
2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

H. Hazardous Materials: Present in buildings and structures to be selectively demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.

1. Hazardous material remediation is specified elsewhere in the Contract Documents.
2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.
3. Owner will provide material safety data sheets for suspected hazardous materials that are known to be present in buildings and structures to be selectively demolished because of building operations or processes performed there.

I. Historic Areas: Demolition and hauling equipment and other materials shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, including temporary protection, by 12 inches or more.

J. Storage or sale of removed items or materials on-site is not permitted.

K. 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.

1.10 SCOPE OF SELECTIVE DEMOLITION WORK

A. Contractor shall be responsible for determining scope of all demolition, cutting, patching, fitting, and coring required for removal, installation, and completion of all work.

1.11 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties.

B. Notify warrantor on completion of selective demolition and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

1.12 COORDINATION WITH OWNER

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

B. Coordinate with Owner to minimize interruptions of existing facilities operations.

C. Schedule outages of building systems and utilities at least 72 hours prior to interruption.

D. If selective demolition affects the Owner’s occupancy, it must be scheduled when Owner is not occupying building, including requiring Contractor to work at night or on weekends at no additional cost to the Owner.

E. Coordinate work with Selective Salvage and Asbestos Abatement.

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. Prior to removal of structural systems or elements ensure shoring is in place.

D. Demolish work as indicated or as required to complete work, including attachment devices, accessories, appurtenances, setting materials, and similar items.

E. Make remaining surfaces ready to accept new work.

F. If concealed mechanical or electrical utilities are encountered, investigate function of utility and notify Architect immediately.

G. Stop work immediately and notify Architect if adjacent structures are endangered. Do not resume operations until corrective measures have been taken.

H. Sawcut concrete, masonry and asphalt to provide smooth, straight edges.

I. Use of open flame torch is prohibited.

J. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.

K. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

L. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.

1. Comply with requirements specified in Section 01 32 33 "Photographic Documentation."

2. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
3. 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. Protect existing buildings, equipment, contents, and adjacent properties from damage.

B. Provide dustproof and weatherproof enclosures around areas of selective demolition.

C. Protect existing improvements, equipment, and furnishings to remain.

D. Shore structural components of selective demolition where indicated or required.

E. Mark locations of disconnected utilities and indicate capping locations on Project Record documents.

F. Provide barriers, safety guards, and warnings lights for public protection as required by law and ordinance or as required to keep personnel safe.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.

    a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
    c. Equipment to Be Removed: Disconnect and cap services and remove equipment.

d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

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

3.4 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 50 00 "Temporary Facilities and Controls."

B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

C. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.

2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
5. Maintain fire watch during and for at least 12 hours after flame-cutting operations.
6. Maintain adequate ventilation when using cutting torches.
7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
10. Dispose of demolished items and materials promptly. Comply with requirements in Section 01 74 19 "Construction Waste Management and Disposal."

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

C. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner or as indicated on Drawings.
5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.6 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. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight.

1. Remove existing roof membrane, flashings, copings, and roof accessories.
2. Remove existing roofing system down to substrate.
3. Remove existing roof membrane and existing roof membrane systems in a manner not to damage substrates to remain.
4. Provide temporary protection devices to ensure the existing built-up roof membrane system materials and associated debris remain within the work area during removal.
5. Coordinate the removal of existing roof systems with new roof systems. Do not remove more roof system than can be made watertight and weathertight with new roof in the same day.
6. Provide temporary protection devices so that existing building remains watertight and weathertight at all times
7. Maintain existing roof drains free of debris and operational until installation of new roof drains.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and recycle or dispose of them according to Section 01 74 19 "Construction Waste Management and Disposal."

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

4. Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

C. Remove and dispose of contaminated, vermin-infested, or dangerous 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.

B. Remove demolition debris from buildings and grounds as work proceeds, not less than once a day.

C. Dispose of all debris and items to be removed, legally off-site.

D. Repair damaged items to like or better conditions than those existing prior to damage occurring.

END OF SECTION 02 41 19

SECTION 03 20 00 - CONCRETE REINFORCING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Steel reinforcement bars.
2. Welded-wire reinforcement.

B. Related Requirements:
1. Section 03 30 00 "Cast-in-Place Concrete", including concrete materials, mixture design, placement procedures, and finishes.
2. Section 32 13 13 "Concrete Paving" for reinforcing related to concrete pavement and walks.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Meeting: Conduct preinstallation meeting as part of general construction meeting or separately as necessary.

1. Review the following:

a. Special inspection and testing and inspecting agency procedures for field quality control.
b. Construction contraction and isolation joints.
c. Steel-reinforcement installation.

1.4 ACTION SUBMITTALS

A. Product Data: For the following:

1. Each type of steel reinforcement.
2. Epoxy repair coating.
3. Zinc repair material.
4. Bar supports.
5. Mechanical splice couplers.
6. Structural thermal break insulated connection system.

B. Sustainable Design Submittals:

C. Shop Drawings: Comply with ACI SP-066:

1. Include placing drawings that detail fabrication, bending, and placement.
2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.
3. For structural thermal break insulated connection system, indicate general configuration, insulation dimensions, tension bars, compression pads, shear bars, and dimensions.

D. Construction Joint Layout: Indicate proposed construction joints required to build the structure.

1. Location of construction joints is subject to approval of the Architect.

E. Delegated-Design Submittal: For structural thermal break insulated connection system, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Statements: For [delegated-design engineer] [testing and inspection agency].

B. Delegated-Design Engineer Qualifications: Include the following:

1. Experience providing delegated-design engineering services of the type indicated.
2. Documentation that delegated-design engineer is licensed in the state in which Project is located.

C. Welding certificates.

1. Reinforcement To Be Welded: Welding procedure specification in accordance with AWS D1.4/D1.4M

D. Material Certificates: For each of the following, signed by manufacturers:

1. Epoxy-Coated Reinforcement: CRSI's "Epoxy Coating Plant Certification."
2. Dual-Coated Reinforcement: CRSI's "Epoxy Coating Plant Certification."

E. Material Test Reports: For the following, from a qualified testing agency:

1. Steel Reinforcement:

a. For reinforcement to be welded, mill test analysis for chemical composition and carbon equivalent of the steel in accordance with ASTM A706/A706M.

2. Mechanical splice couplers.

F. Field quality-control reports.

G. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

B. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.4/D 1.4M.

C. Mockups: Reinforcing for cast-concrete formed surfaces, to demonstrate tolerances and standard of workmanship.

1. Build panel approximately 100 sq. ft. for formed surface in the location indicated on Drawings or, if not indicated, as directed by Architect.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage, including but not limited to, coatings on steel reinforcement.

1. Store reinforcement to avoid contact with earth.
2. Do not allow epoxy-coated reinforcement to be stored outdoors for more than 60 days without being stored under an opaque covering.
3. Do not allow dual-coated reinforcement to be stored outdoors for more than 60 days without being stored under an opaque covering.
4. Do not allow stainless steel reinforcement to come into contact with uncoated reinforcement.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design structural thermal break insulated connection system, including attachment to building construction.

B. Structural Performance of Structural Thermal Break Insulating Connection System: Structural thermal break insulated connection system shall withstand the following loads and stresses:

1. Dead Loads: As indicated on Drawings.

    a. Shear Load: As indicated on Drawings.
    b. Bending Moment: As indicated on Drawings.

2. Live Loads: As indicated on Drawings.

    a. Shear Load: As indicated on Drawings.
    b. Bending Moment: As indicated on Drawings.

C. Seismic Performance of Structural Thermal Break Insulated Connection System: Structural thermal break Insulated connection system shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A615/A615M, Grade as indicated on drawings or, at minimum, Grade 80, deformed.

B. Low-Alloy Steel Reinforcing Bars: ASTM A706/A706M, deformed.

C. Headed-Steel Reinforcing Bars: ASTM A970/A970M.

D. Galvanized Reinforcing Bars:

1. Steel Bars: Grade as indicated on drawings or, at minimum, Grade 80, deformed.
2. Zinc Coating: ASTM A767/A767M, Class I zinc coated after fabrication and bending.

E. Epoxy-Coated Reinforcing Bars:

1. Steel Bars: Grade as indicated on drawings or, at minimum, Grade 80, deformed.
2. Epoxy Coating: ASTM A775/A775M or ASTM A934/A934M with less than 2 percent damaged coating in each 12-inch bar length.

F. Dual-Coated Reinforcing Bars: ASTM A1055/A1055M.

1. Steel Bars: Grade as indicated on drawings or, at minimum, Grade 80, deformed.
2. Zinc Coating: ASTM A1055/A1055M Type I.
3. Epoxy Coating: ASTM A775/A775M or ASTM A934/A934M with less than 2 percent damaged coating in each 12-inch bar length.

G. Steel Bar Mats: ASTM A184/A184M, fabricated from grade as indicated on drawings or, at minimum, ASTM A615/A615M, Grade 60, deformed bars, assembled with clips.

H. Plain-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from as-drawn steel wire into flat sheets.

I. Deformed-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, flat sheet.

J. Galvanized-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from galvanized-steel wire into flat sheets.

K. Epoxy-Coated Welded-Wire Reinforcement: ASTM A884/A884M, Class A coated, Type 1, plain or deformed steel as indicated on drawings.

2.3 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A615/A615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.

B. Epoxy-Coated Joint Dowel Bars: ASTM A615/A615M, Grade 60, plain-steel bars, ASTM A775/A775M epoxy coated.

C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.

1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.
b. For epoxy-coated reinforcement, use CRSI Class 1A epoxy-coated or other dielectric-polymer-coated wire bar supports.
c. For dual-coated reinforcement, use CRSI Class 1A epoxy-coated or other dielectric-polymer-coated wire bar supports.
d. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.
e. For stainless steel reinforcement, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.

D. Mechanical Splice Couplers: ACI 318 Type 1 or Type 2, same material of reinforcing bar being spliced.

E. Structural Thermal Break Insulated Connection System:
1. Tension Rods: As indicated on drawings or, at minimum, Carbon steel, welded with ASTM A276/A276M, Type 316 stainless steel.
2. Shear Reinforcement Rods: As indicated on drawings or, at minimum, Carbon steel, welded with ASTM A276/A276M, Type 316 stainless steel bar.
3. Pressure pads: ASTM A276/A276M, Type 316 stainless steel.
4. Insulation body: Polystyrene.

F. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than 0.0508 inch in diameter.

1. Finish: Plain or Galvanized ASTM A884/A884M, Class A, Type 1, epoxy coated, with less than 2 percent damaged coating in each 12-inch wire length].

G. Stainless Steel Tie Wire: ASTM A1022/A1022M, not less than 0.0508 inch in diameter.

H. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A775/A775M.

I. Zinc Repair Material: ASTM A780/A780M.

2.4 FABRICATING REINFORCEMENT

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

PART 3 - EXECUTION

3.1 PREPARATION

A. Protection of In-Place Conditions:

1. Do not cut or puncture vapor retarder.
2. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.2 INSTALLATION OF STEEL REINFORCEMENT

A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.

B. Accurately position, support, and secure reinforcement against displacement.

1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
2. Do not tack weld crossing reinforcing bars.

C. Preserve clearance between bars of not less than 1 inch, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.

D. Provide concrete coverage in accordance with ACI 318.

E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

F. Splices: Lap splices as indicated on Drawings.

1. Bars indicated to be continuous, and all vertical bars shall be lapped not less than 36 bar diameters at splices, or 24 inches, whichever is greater.
2. Stagger splices in accordance with ACI 318.

3. Mechanical Splice Couplers: Install in accordance with manufacturer's instructions.
4. Weld reinforcing bars in accordance with AWS D1.4/D 1.4M, where indicated on Drawings.

G. Install structural thermal break insulated connection system in accordance with manufacturer's instructions.

H. Install welded-wire reinforcement in longest practicable lengths.

1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."

a. For reinforcement less than W4.0 or D4.0, continuous support spacing shall not exceed 12 inches.

2. Lap edges and ends of adjoining sheets at least one wire spacing plus 2 inches for plain wire and 8 inches for deformed wire.
3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
4. Lace overlaps with wire.

I. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating in accordance with ASTM D3963/D3963M.

J. Dual-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating in accordance with ASTM D3963/D3963M.

K. Zinc-Coated Reinforcement: Repair cut and damaged zinc coatings with zinc repair material in accordance with ASTM A780/A780M.

3.3 JOINTS

A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement.
2. Continue reinforcement across construction joints unless otherwise indicated.
3. Do not continue reinforcement through sides of strip placements of floors and slabs.

B. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length, to prevent concrete bonding to one side of joint.

3.4 INSTALLATION TOLERANCES

A. Comply with ACI 117.

3.5 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

C. Inspections:

1. Steel-reinforcement placement.
2. Steel-reinforcement mechanical splice couplers.
3. Steel-reinforcement welding.

D. Manufacturer's Inspections: Engage manufacturer of structural thermal break insulated connection system to inspect completed installations prior to placement of concrete, and to provide written report that installation complies with manufacturer's written instructions.

END OF SECTION 03 20 00

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.

B. Related Requirements:
   1. Section 03 20 00 "Concrete Reinforcing" for steel reinforcing bars and welded-wire reinforcement.
   2. Section 32 13 13 "Concrete Paving" for concrete pavement and walks.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Meeting: Conduct meeting at project site. Conduct preinstallation meeting as part of general construction meeting or separately as necessary.
   1. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
      a. Contractor's superintendent.
      b. Independent testing agency responsible for concrete design mixtures.
      c. Ready-mix concrete manufacturer.
      d. Concrete Subcontractor.
   2. Review the following:
      a. Special inspection and testing and inspecting agency procedures for field quality control.
      b. Construction joints, control joints, isolation joints, and joint-filler strips.
      c. Semirigid joint fillers.
      d. Vapor-retarder installation.
      e. Anchor rod and anchorage device installation tolerances.
      f. Cold and hot weather concreting procedures.
      g. Concrete finishes and finishing.

h. Curing procedures.
i. Forms and form-removal limitations.
j. Shoring and reshoring procedures.
k. Methods for achieving specified floor and slab flatness and levelness.
l. Floor and slab flatness and levelness measurements.
m. Concrete repair procedures.
n. Concrete protection.
o. Initial curing and field curing of field test cylinders (ASTM C31/C31M.)
p. Protection of field cured field test cylinders.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. Shop Drawings:
1. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
2. Construction Joint Layout: Indicate proposed construction joints required to construct the structure. Location of construction joints is subject to approval of the Architect.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For the following:
1. Installer: Include copies of applicable ACI certificates.
2. Ready-mixed concrete manufacturer.

B. Floor surface flatness and levelness measurements report, indicating compliance with specified tolerances.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs Project personnel qualified as an ACI-certified Flatwork Technician and Finisher and a supervisor who is a an ACI Concrete Flatwork Technician.

B. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

C. Testing Agency Qualifications: The Owner shall engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with ASTM C94/C94M and ACI 301.

B. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.

C. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants

1.9 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 301 and ACI 306.1 and as follows.
   1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
   2. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
   3. Do not use frozen materials or materials containing ice or snow.
   4. Do not place concrete in contact with surfaces less than 35 deg F, other than reinforcing steel.
   5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:
   1. Maintain concrete temperature at time of discharge to not exceed 95 deg F.
   2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

A. Source Limitations:
   1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
   2. Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant.
   3. Obtain aggregate from single source.
   4. Obtain each type of admixture from single source from single manufacturer.

B. Cementitious Materials:

1. Portland Cement: ASTM C 150/C 150M, Type I or Type II.
2. Fly Ash: ASTM C618, Class C or F.
3. Slag Cement: ASTM C989/C989M, Grade 100 or 120.

C. Normal-Weight Aggregates: ASTM C 33/C 33M, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

D. Air-Entraining Admixture: ASTM C260/C260M.

E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride in steel-reinforced concrete.
1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
2. Retarding Admixture: ASTM C494/C494M, Type B.
3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.
7. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C494/C494M, Type C.
8. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.

F. Water: ASTM C94/C94M, potable

2.3 FIBER REINFORCEMENT

A. Synthetic Monofilament Micro-Fiber: Monofilament polypropylene micro-fibers engineered and designed for use in concrete, complying with ASTM C1116/C1116M, Type III, 1/2 to 2-1/4 inches long.

B. Synthetic Fibrillated Micro-Fiber: Fibrillated polypropylene micro-fibers engineered and designed for use in concrete, complying with ASTM C1116/C1116M, Type III, 1/2 to 2-1/4 inches long.

C. Synthetic Macro-Fiber: Synthetic macro-fibers engineered and designed for use in concrete, complying with ASTM C1116/C1116M, Type III, 1/2 to 2-1/4 inches long.

2.4 VAPOR RETARDERS

A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A; not less than 10 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.

1. Products: Subject to compliance with requirements, available products that may be, but not limited to, the flowing:
2. a. Meadows, W. R., Inc; Perminator 15 mil
3. b. Raven Industries In; Vapor Block 15
4. c. Reef Industries, Inc; Griffolyn Type-105
5. d. Stego Industries, LLC Stego Wrap 15 mil

2.5 FLOOR AND SLAB TREATMENTS

A. Slip-Resistive Emery Aggregate Finish: Factory-graded, packaged, rustproof, non-glazing, abrasive, crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials with 100 percent passing 3/8-inch sieve.

B. Slip-Resistive Aluminum Granule Finish: Factory-graded, packaged, rustproof, non-glazing, abrasive aggregate of not less than 95 percent fused aluminum-oxide granules.

2.6 CURING MATERIALS

A. Clear, Solvent-Borne, Membrane-Forming, Curing and Sealing Compound: ASTM C1315, Type 1, Class A.
   1. Products: Subject to compliance with requirements
      a. BASF Construction Chemicals - Building Systems; Kure-N-Seal 25 LV.
      b. ChemMasters; Spray-Cure & Seal Plus.
      c. Conspec by Dayton Superior; Sealcure 1315.
      d. Dayton Superior Corporation; Day-Chem Cure and Seal (J-22UV).
      e. Edoco by Dayton Superior; Cureseal 1315.
      f. Euclid Chemical Company (The), an RPM company; Super Diamond Clear; LusterSeal 300.
      g. Kaufman Products, Inc.; Sure Cure 25.
      h. Lambert Corporation; UV Super Seal.
      i. L&M Construction Chemicals, Inc.; Lumiseal Plus.
      j. Meadows, W. R., Inc.; CS-309/30.

2.7 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips.

B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, in accordance with ASTM D2240.

C. Bonding Agent: ASTM C1059/C1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade and class to suit requirements, and as follows:

2.8 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
   1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
   2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
   3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand, as recommended by underlayment manufacturer.
   4. Compressive Strength: Not less than 5000 psi at 28 days when tested in accordance with ASTM C109/C109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.
   1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
   2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
   3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
   4. Compressive Strength: Not less than 5000 psi at 28 days when tested in accordance with ASTM C109/C109M.

2.9 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301.
   1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
   1. Fly Ash or Other Pozzolans: 25 percent by mass.
   2. Slag Cement: 50 percent by mass.
   3. Silica Fume: 10 percent by mass.
   4. Total of Fly Ash or Other Pozzolans, Slag Cement, and Silica Fume: 50 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.
   5. Total of Fly Ash or Other Pozzolans and Silica Fume: 35 percent by mass with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.

C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.
   1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
   2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
   3. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

4. Use permeability-reducing admixture in concrete mixtures where indicated.

2.10 CONCRETE MIXTURES

A. Class A: Normal-weight concrete used for footings, grade beams, and tie beams.
   1. Exposure Class: ACI 318.
   2. Minimum Compressive Strength: As indicated on drawings or, at minimum, 5000 psi at 28 days.
   3. Maximum w/cm: As indicated on drawings or, at minimum, 0.50.
   4. Slump Limit: As indicated on drawings or, at minimum, 4 inches, plus or minus 1 inch.
   5. Slump Flow Limit: As indicated on drawings or, at minimum, 22 inches, plus or minus 1.5 inches.
   6. Air Content:
   7. Limit water-soluble, chloride-ion content in hardened concrete to 1.00 percent by weight of cement.

B. Class C: Normal-weight concrete used for interior slabs-on-ground.
   1. Exposure Class: ACI 318.
   2. Minimum Compressive Strength: As indicated on drawings or, at minimum, 5000 psi. at 28 days.
   3. Maximum w/cm: As indicated on drawings or, at minimum, 0.50.
   4. Minimum Cementitious Materials Content: 470 lb./cu. yd.
   5. Slump Limit: As indicated on drawings or, at minimum, 4 inches, plus or minus 1 inch.
   6. Slump Flow Limit: As indicated on drawings or, at minimum, 22 inches, plus or minus 1.5 inches.
   7. Air Content:
      a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors.
   8. Limit water-soluble, chloride-ion content in hardened concrete to 1.00 percent by weight of cement minimum unless otherwise indicated on drawings.
   9. Steel-Fiber Reinforcement: Add to concrete mixture, in accordance with manufacturer's written instructions, at a rate of 50 lb./cu. yd.
   10. Synthetic Micro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than a rate of 1.5 lb./cu. yd.
   11. Synthetic Macro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than a rate of 5 lb./cu. yd.

C. Class F: Normal-weight concrete used for concrete toppings.
   1. Exposure Class: ACI 318.
   2. Minimum Compressive Strength: As indicated on drawings or, at minimum, 5000 psi. at 28 days.
   3.
   4. Minimum Cementitious Materials Content: 470 lb./cu. yd.
   5. Slump Limit: 4 inches, plus or minus 1 inch.
   6. Air Content:
      a. Exposure Class F1: As indicated on drawings or, at minimum, 5.0 percent, plus or minus 1.5 percent at point of delivery for concrete containing 3/4-inch nominal maximum aggregate size.

b. Exposure Classes F2 and F3: As indicated on drawings or, at minimum, 6 percent, plus or minus 1.5 percent at point of delivery for concrete containing 3/4-inch nominal maximum aggregate size.

7. Limit water-soluble, chloride-ion content in hardened concrete to 1.00 percent by weight of cement minimum unless otherwise indicated on drawings.
   a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished toppings.
8. Synthetic Micro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than a rate of 1.5 lb./cu. yd.
9. Synthetic Macro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than a rate of 5 lb./cu. yd.

2.11 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
   1. Plywood, metal, or other approved panel materials.

B. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.
   1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

C. Form Ties: Factory-fabricated, removable or snap-off glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

2.12 FABRICATING REINFORCEMENT

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

2.14 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.

B. Zinc Repair Material: ASTM A 780/A 780M.

C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
   1. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

2.15 WATERSTOPS

A. Flexible Rubber Waterstops: CE CRD-C 513, with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.
   1. Profile: As indicated.
   2. Dimensions: 4 inches by 3/16 inch thick; non-tapered.

B. Flexible PVC Waterstops: CE CRD-C 572, with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.
   1. Profile: As indicated.
   2. Dimensions: 4 inches by 3/16 inch thick; non-tapered.

2.16 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M and ASTM C1116/C1116M, and furnish batch ticket information.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete in accordance with ASTM C94/C94M. Mix concrete materials in appropriate drum-type batch machine mixer.
   1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than five minutes after ingredients are in mixer, before any part of batch is released.
   2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.
   3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
   1. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.
   2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:
   1. Daily access to the Work.
   2. Incidental labor and facilities necessary to facilitate tests and inspections.

3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.
4. Security and protection for test samples and for testing and inspection equipment at Project site.

3.3 INSTALLATION OF EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.
   1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.
   3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3.4 INSTALLATION OF VAPOR RETARDER

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.
   1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
   2. Face laps away from exposed direction of concrete pour.
   3. Lap vapor retarder over footings and grade beams not less than 6 inches, sealing vapor retarder to concrete.
   4. Lap joints 6 inches and seal with manufacturer's recommended tape.
   5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
   6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
   7. Protect vapor retarder during placement of reinforcement and concrete.
      a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by 6 inches on all sides, and sealing to vapor retarder.

B. Bituminous Vapor Retarders: Place, protect, and repair bituminous vapor retarder in accordance with manufacturer's written instructions.

3.5 WATERSTOP INSTALLATION

A. Flexible Waterstops: Install in construction joints and at other joints as indicated on plans to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions

3.6 JOINTS

A. Construct joints true to line, with faces perpendicular to surface plane of concrete.

B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.
   1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
   2. Place joints perpendicular to main reinforcement.
      a. Continue reinforcement across construction joints unless otherwise indicated.
      b. Do not continue reinforcement through sides of strip placements of floors and slabs.
   3. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
   4. Locate joints for beams, slabs, joists, and girders at third points of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
   5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
   6. Space vertical joints in walls as indicated on Drawings, unless otherwise indicated on Drawings, locate vertical joints beside piers integral with walls, near corners, and in concealed locations where possible.
   7. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
   8. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:
   1. Grooved Joints: Form control joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of control joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
   2. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.

D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
   1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.
   2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface, where joint sealants, specified in Section 07 92 00 "Joint Sealants," are indicated.
   3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints:
   1. Install dowel bars and support assemblies at joints where indicated on Drawings.
   2. Lubricate or asphalt coat one-half of dowel bar length to prevent concrete bonding to one side of joint.

F. Dowel Plates: Install dowel plates at joints where indicated on Drawings.

3.7 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.
   1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
   2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.

B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.

C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect in writing, but not to exceed the amount indicated on the concrete delivery ticket.
   1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301, but not to exceed the amount indicated on the concrete delivery ticket.
   1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.
   1. If a section cannot be placed continuously, provide construction joints as indicated.
   2. Deposit concrete to avoid segregation.
   3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
   4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301.
      a. Do not use vibrators to transport concrete inside forms.
      b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.
      c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
      d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
   1. Do not place concrete floors and slabs in a checkerboard sequence.
   2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
   3. Maintain reinforcement in position on chairs during concrete placement.

4. Screed slab surfaces with a straightedge and strike off to correct elevations.
5. Level concrete, cut high areas, and fill low areas.
6. Slope surfaces uniformly to drains where required.
7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
8. Do not further disturb slab surfaces before starting finishing operations.

3.8 FINISHING FORMED SURFACES

A. As-Cast Surface Finishes:
   1. ACI 301 Surface Finish SF-1.0: As-cast concrete texture imparted by form-facing material.
      a. Patch voids larger than 1-1/2 inches wide or 1/2 inch deep.
      b. Remove projections larger than 1 inch.
      c. Tie holes do not require patching.
      d. Surface Tolerance: ACI 117 Class D.
      e. Apply to concrete surfaces not exposed to public view.
   2. ACI 301Surface Finish SF-2.0: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams.
      a. Patch voids larger than 3/4 inch wide or 1/2 inch deep.
      b. Remove projections larger than 1/4 inch.
      c. Patch tie holes.
      d. Surface Tolerance: ACI 117 Class B.
      e. Locations: Apply to concrete surfaces exposed to public view.
   3. ACI 301 Surface Finish SF-3.0:
      a. Patch voids larger than 3/4 inch wide or 1/2 inch deep.
      b. Remove projections larger than 1/8 inch.
      c. Patch tie holes.
      d. Surface Tolerance: ACI 117 Class A.

B. Rubbed Finish: Apply the following to as cast surface finishes where indicated on Drawings:
   1. Smooth-Rubbed Finish:
      a. Perform no later than one day after form removal.
      b. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture.
      c. If sufficient cement paste cannot be drawn from the concrete by the rubbing process, use a grout made from the same cementitious materials used in the in-place concrete.
      d. Maintain required patterns or variances as shown on Drawings or to match design reference sample.
   2. Grout-Cleaned Rubbed Finish:
      a. Clean concrete surfaces after contiguous surfaces are completed and accessible.
      b. Do not clean concrete surfaces as Work progresses.
      c. Mix 1 part portland cement to 1-1/2 parts fine sand, complying with ASTM C144 or ASTM C404, by volume, with sufficient water to produce a mixture with the consistency of thick paint. Add white portland cement in

amounts determined by trial patches, so color of dry grout matches adjacent surfaces.
d. Wet concrete surfaces.
e. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap, and keep surface damp by fog spray for at least 36 hours.
f. Maintain required patterns or variances as shown on Drawings or to match design reference sample.

3. Cork-Floated Finish:
a. Mix 1 part portland cement to 1 part fine sand, complying with ASTM C144 or ASTM C404, by volume, with sufficient water to produce a mixture with the consistency of thick paint.
b. Mix 1 part portland cement and 1 part fine sand with sufficient water to produce a mixture of stiff grout. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces.
c. Wet concrete surfaces.
d. Compress grout into voids by grinding surface.
e. In a swirling motion, finish surface with a cork float.
f. Maintain required patterns or variances as shown on Drawings or to match design reference sample.

3.9 FINISHING FLOORS AND SLABS

A. Comply with ACI 302.1R recommendations for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Float Finish:
1. When bleed water sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats.
2. Repeat float passes and re-straightening until surface is left with a uniform, smooth, granular texture and complies with ACI 117 tolerances for conventional concrete.
3. Apply float finish to surfaces to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

C. Trowel Finish:
1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
4. Do not add water to concrete surface.
5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.

6. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
7. Finish surfaces to the following tolerances, in accordance with ASTM E1155, for a randomly trafficked floor surface:
    a. Slabs on Ground:
        1) Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4 inch.
        2) Specified overall values of flatness, F_F 25; and of levelness, F_L 20; with minimum local values of flatness, F_F 17; and of levelness, F_L 15.

D. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.
2. Coordinate required final finish with Architect before application.

E. Slip-Resistive Finish: Before final floating, apply slip-resistive aggregate or aluminum granule finish to concrete stair treads, platforms, ramps as indicated on Drawings
1. Apply in accordance with manufacturer's written instructions and as follows:
    a. Uniformly spread 25 lb./100 sq. ft. of dampened slip-resistive aggregate over surface in one or two applications.
    b. Tamp aggregate flush with surface, but do not force below surface.
    c. After broadcasting and tamping, apply float finish.
    d. After curing, lightly work surface with a steel wire brush or an abrasive stone and water to expose slip-resistive aggregate.

3.10 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

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

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations:
1. Coordinate sizes and locations of concrete bases with actual equipment provided.
2. Construct concrete bases 4 inches high unless otherwise indicated on Drawings, and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated on Drawings, or unless required for seismic anchor support.
3. Minimum Compressive Strength: As indicated on drawings or, at minimum, 5000 psi. at 28 days.

4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
6. Prior to pouring concrete, place and secure anchorage devices.
    a. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
    b. Cast anchor-bolt insert into bases.
    c. Install anchor bolts to elevations required for proper attachment to supported equipment.

3.11 CONCRETE CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
1. Comply with ACI 301 and ACI 306.1 for cold weather protection during curing.
2. Comply with ACI 301 and ACI 305.1 for hot-weather protection during curing.
3. Maintain moisture loss no more than 0.2 lb./sq. ft. x h before and during finishing operations.

B. Curing Formed Surfaces: Comply with ACI 308.1 as follows:
1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
2. If forms remain during curing period, moist cure after loosening forms.
3. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:
    a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
    b. Continuous Sprinkling: Maintain concrete surface continuously wet.
    c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
    d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
    e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
        1) Recoat areas subject to heavy rainfall within three hours after initial application.
        2) Maintain continuity of coating and repair damage during curing period.

C. Curing Unformed Surfaces: Comply with ACI 308.1 as follows:
1. Begin curing immediately after finishing concrete.
2. Interior Concrete Floors:
    a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:
        1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.

a) Lap edges and ends of absorptive cover not less than 12-inches.
b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.

2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
b) Cure for not less than seven days.

3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
a) Water.
b) Continuous water-fog spray.

b. Floors to Receive Penetrating Liquid Floor Treatments: Contractor has option of the following:
1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
a) Lap edges and ends of absorptive cover not less than 12 inches.
b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.

2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
b) Cure for not less than seven days.

3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
a) Water.
b) Continuous water-fog spray.

c. Floors to Receive Polished Finish: Contractor has option of the following:
1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
a) Lap edges and ends of absorptive cover not less than 12 inches.
b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.

2) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
a) Water.
b) Continuous water-fog spray.

3.12 TOLERANCES

A. Conform to ACI 117.

3.13 JOINT FILLING

A. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.
   1. Defer joint filling until concrete has aged at least one month.
   2. Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints.

D. Overfill joint, and trim joint filler flush with top of joint after hardening.

3.14 CONCRETE SURFACE REPAIRS

A. Defective Concrete:
   1. Repair and patch defective areas when approved by Architect.
   2. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
   1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete.
      a. Limit cut depth to 3/4 inch.
      b. Make edges of cuts perpendicular to concrete surface.
      c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.
      d. Fill and compact with patching mortar before bonding agent has dried.
      e. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
   2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement, so that, when dry, patching mortar matches surrounding color.
      a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
      b. Compact mortar in place and strike off slightly higher than surrounding surface.

3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces:
   1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.
      a. Correct low and high areas.
      b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
   2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
   3. After concrete has cured at least 14 days, correct high areas by grinding.
   4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar.
      a. Finish repaired areas to blend into adjacent concrete.
   5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.
      a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
      b. Feather edges to match adjacent floor elevations.
   6. Correct other low areas scheduled to remain exposed with repair topping.
      a. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations.
      b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
   7. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete.
      a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch clearance all around.
      b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
      c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
      d. Place, compact, and finish to blend with adjacent finished concrete.
      e. Cure in same manner as adjacent concrete.
   8. Repair random cracks and single holes 1 inch or less in diameter with patching mortar.
      a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
      b. Dampen cleaned concrete surfaces and apply bonding agent.
      c. Place patching mortar before bonding agent has dried.
      d. Compact patching mortar and finish to match adjacent concrete.
      e. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.15 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.

B. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
   1. Testing agency shall be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31/C31M.
   2. Testing agency shall immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
   3. Testing agency shall report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.
      a. Test reports shall include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:
         1) Project name.
         2) Name of testing agency.
         3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
         4) Name of concrete manufacturer.
         5) Date and time of inspection, sampling, and field testing.
         6) Date and time of concrete placement.
         7) Location in Work of concrete represented by samples.
         8) Date and time sample was obtained.
         9) Truck and batch ticket numbers.
         10) Design compressive strength at 28 days.
         11) Concrete mixture designation, proportions, and materials.
         12) Field test results.
         13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
         14) Type of fracture and compressive break strengths at seven days and 28 days.

C. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.

D. Inspections:
   1. Headed bolts and studs.
   2. Verification of use of required design mixture.
   3. Concrete placement, including conveying and depositing.
   4. Curing procedures and maintenance of curing temperature.

5. Verification of concrete strength before removal of shores and forms from beams and slabs.
6. Batch Plant Inspections: On a random basis, as determined by Architect.

E. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M shall be performed in accordance with the following requirements:
   1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
      a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
   2. Slump: ASTM C143/C143M:
      a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
      b. Perform additional tests when concrete consistency appears to change.
   3. Slump Flow: ASTM C1611/C1611M:
      a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
      b. Perform additional tests when concrete consistency appears to change.
   4. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete.
      a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
   5. Concrete Temperature: ASTM C1064/C1064M:
      a. One test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
   6. Unit Weight: ASTM C567/C567M fresh unit weight of structural lightweight concrete.
      a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
   7. Compression Test Specimens: ASTM C31/C31M:
      a. Cast and laboratory cure two sets of two 6-inch by 12-inch or 4-inch by 8-inch cylinder specimens for each composite sample.
      b. Cast, initial cure, and field cure two sets of three standard cylinder specimens for each composite sample.
   8. Compressive-Strength Tests: ASTM C39/C39M.
      a. Test one set of three laboratory-cured specimens at seven days and one set of two specimens at 28 days.
      b. Test one set of three field-cured specimens at seven days and one set of two specimens at 28 days.
      c. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
   9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
   10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi if specified compressive strength is

5000 psi, or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi.

11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
12. Additional Tests:
    a. Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
    b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.
        1) Acceptance criteria for concrete strength shall be in accordance with ACI 301 section 1.6.6.3.
13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
14. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

F. Measure floor and slab flatness and levelness in accordance with ASTM E1155 within 48 hours of completion of floor finishing and promptly report test results to Architect.

3.16 PROTECTION

A. Protect concrete surfaces as follows:
1. Protect from petroleum stains.
2. Diaper hydraulic equipment used over concrete surfaces.
3. Prohibit vehicles from interior concrete slabs.
4. Prohibit use of pipe-cutting machinery over concrete surfaces.
5. Prohibit placement of steel items on concrete surfaces.
6. Prohibit use of acids or acidic detergents over concrete surfaces.
7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.
8. Protect concrete surfaces scheduled to receive surface hardener or polished concrete finish using Floor Slab Protective Covering.

END OF SECTION 03 30 00

SECTION 05 12 00 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Structural steel.
2. Prefabricated building columns.
3. Shear stud connectors.
4. Shrinkage-resistant grout.

B. Related Requirements:

1. Section 05 12 13 "Architecturally Exposed Structural Steel Framing" for additional requirements for architecturally exposed structural steel.
2. Section 05 31 00 "Steel Decking" for field installation of shear stud connectors through deck.
3. Section 05 50 00 "Metal Fabrications" for [steel lintels and shelf angles not attached to structural-steel frame] [miscellaneous steel fabrications] and other steel items not defined as structural steel.
4. [Section 09 91 13 "Exterior Painting" and Section 09 91 23 "Interior Painting"] [and] [Section 09 96 00 "High-Performance Coatings"] for painting requirements.
5. Section 13 34 19 "Metal Building Systems" for structural steel.

1.3 DEFINITIONS

A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in ANSI/AISC 303.

B. Seismic-Load-Resisting System: Elements of structural-steel frame designated as "SLRS" or along grid lines designated as "SLRS" on Drawings, including columns, beams, and braces and their connections.

C. Heavy Sections: Rolled and built-up sections as follows:

1. Shapes included in ASTM A6/A6M with flanges thicker than 1-1/2 inches.
2. Welded built-up members with plates thicker than 2 inches.
3. Column base plates thicker than 2 inches.

D. Protected Zone: Structural members or portions of structural members indicated as "protected zone" on Drawings. Connections of structural and nonstructural elements to protected zones are limited.

E. Demand-Critical Welds: Those welds, the failure of which would result in significant degradation of the strength and stiffness of the seismic-load-resisting system and which are indicated as "demand critical" or "seismic critical" on Drawings.

1.4 COORDINATION

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

B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Meeting: Conduct meeting at project site. Conduct preinstallation meeting as part of general construction meeting or separately as necessary.

1.6 ACTION SUBMITTALS

A. Product Data:

1. Structural-steel materials.
2. High-strength, bolt-nut-washer assemblies.
3. Shear stud connectors.
4. Anchor rods.
5. Threaded rods.
6. Forged-steel hardware.
7. Slide bearings.
8. Prefabricated building columns.
9. Shop primer.
10. Galvanized-steel primer.
11. Etching cleaner.
12. Galvanized repair paint.
13. Shrinkage-resistant grout.

B. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment Drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.
5. Identify members and connections of the seismic-load-resisting system.
6. Indicate locations and dimensions of protected zones.
7. Identify demand-critical welds.
8. Identify members not to be shop primed.

C. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide in accordance with AWS D1.1/D1.1M for each welded joint qualified by testing, including the following:

1. Power source (constant current or constant voltage).
2. Electrode manufacturer and trade name, for demand-critical welds.

D. Delegated-Design Submittal: For structural-steel connections indicated on Drawings to comply with design loads, include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Welding certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

D. Mill test reports for structural-steel materials, including chemical and physical properties.

E. Product Test Reports: For the following:

1. Bolts, nuts, and washers, including mechanical properties and chemical analysis.
2. Direct-tension indicators.
3. Tension-control, high-strength, bolt-nut-washer assemblies.
4. Shear stud connectors.

F. Survey of existing conditions.

G. Source quality-control reports.

H. Field quality-control reports.

1.8 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category BU or is accredited by the IAS Fabricator Inspection Program for Structural Steel (Acceptance Criteria 172).

B. Installer Qualifications: A qualified Installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category ACSE or Category CSE.

C. Shop-Painting Applicators: Qualified in accordance with AISC's Sophisticated Paint Endorsement or to SSPC-QP 3.

D. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1/D1.1M.

1. Welders and welding operators performing work on bottom-flange, demand-critical welds shall pass the supplemental welder qualification testing, as required by AWS D1.8/D1.8M. FCAW-S and FCAW-G shall be considered separate processes for welding personnel qualification.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and

spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
2. Clean and relubricate bolts and nuts that become dry or rusty before use.
3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F3125/F3125M, Grade F1852 bolt assemblies and for retesting bolt assemblies after lubrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with applicable provisions of the following specifications and documents:

1. ANSI/AISC 303.
2. ANSI/AISC 341.
3. ANSI/AISC 360.
4. RCSC's "Specification for Structural Joints Using High-Strength Bolts."

B. Connection Design Information:

1. Connection designs have been completed and connections indicated on the Drawings.

C. Moment Connections: Type PR, partially or Type FR, fully restrained as indicated on the drawings.

D. Construction: Moment frame, Braced frame, Shear wall system, Combined system of moment frame and braced frame, Combined system of moment frame and shear walls, Combined system of braced frame and shear walls, or Combined system of moment frame, braced frame, and shear walls.

2.2 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: Grade as indicated on drawings or, at minimum, ASTM A529/A529M, Grade 50.

B. Channels, Angles, M-Shapes, S-Shapes: Grade as indicated on drawings or, at minimum, ASTM A529/A529M, Grade 50.

C. Plate and Bar: Grade as indicated on drawings or, at minimum, ASTM A572/A572M, Grade 50.

D. Corrosion-Resisting (Weathering) Structural-Steel Shapes, Plates, and Bars: ASTM A588/A588M, 50 ksi.

E. Cold-Formed Hollow Structural Sections: Grade as indicated on drawings or, at minimum, ASTM A500/A500M, Grade C structural tubing.

F. Corrosion-Resisting (Weathering), Cold-Formed Hollow Structural Sections: ASTM A847/A847M structural tubing.

G. Steel Pipe: ASTM A53/A53M, Type E or Type S, Grade B.

1. Weight Class: As indicated on drawings or, at minimum, Extra strong.
2. Finish: Black except where indicated to be galvanized.

H. Steel Castings: ASTM A216/A216M, Grade WCB, with supplementary requirement S11.

I. Steel Forgings: ASTM A668/A668M.

J. Welding Electrodes: Comply with AWS requirements.

2.3 BOLTS AND CONNECTORS

A. High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.

1. Direct-Tension Indicators: ASTM F959/F959M, Type 325-1, compressible-washer type with plain finish.

B. High-Strength A490 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A490, Type 1, heavy-hex steel structural bolts or Grade F2280 tension-control, bolt-nut-washer assemblies with splined ends; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.

1. Direct-Tension Indicators: ASTM F959/F959M, Type 490-1, compressible-washer type with plain finish.

C. Zinc-Coated High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.

1. Finish: Hot-dip or mechanically deposited zinc coating.
2. Direct-Tension Indicators: ASTM F959/F959M, Type 325-1, compressible-washer type with mechanically deposited zinc coating, baked epoxy-coated finish.

D. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F3125/F3125M, Grade F1852, Type 1, heavy-hex or round head assemblies, consisting of steel structural bolts with splined ends; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.

1. Finish: Mechanically deposited zinc coating.

E. Shear Stud Connectors: ASTM A108, AISI C-1015 through C-1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.

2.4 RODS

A. Unheaded Anchor Rods: Grade as indicated on drawings or, at minimum ASTM A572/A572M, Grade 50.

1. Configuration: Straight or Hooked as indicated.
2. Nuts: ASTM A563 heavy-hex carbon steel.
3. Plate Washers: ASTM A36/A36M carbon steel.
4. Washers: ASTM F436, Type 1, hardened carbon steel.
5. Finish: Hot-dip zinc coating, ASTM A153/A153M, Class C.

B. Headed Anchor Rods: Grade as indicated on drawings or, at minimum ASTM F1554, Grade 55, weldable, straight.

1. Nuts: ASTM A563 heavy-hex carbon steel.
2. Plate Washers: ASTM A36/A36M carbon steel.
3. Washers: ASTM F436, Type 1, hardened carbon steel.
4. Finish: Hot-dip zinc coating, ASTM A153/A153M, Class C.

C. Threaded Rods: Grade as indicated on drawings or, at minimum ASTM A354, Grade BD.

1. Nuts: ASTM A63 heavy-hex carbon steel.
2. Washers: ASTM A36/A36M carbon steel.
3. Finish: Hot-dip zinc coating, ASTM A153/A153M, Class C.

2.5 FORGED-STEEL STRUCTURAL HARDWARE

A. Clevises and Turnbuckles: Made from cold-finished carbon-steel bars, ASTM A108, AISI C-1035.

B. Eye Bolts and Nuts: Made from cold-finished carbon-steel bars, ASTM A108, AISI C-1030.

C. Sleeve Nuts: Made from cold-finished carbon-steel bars, ASTM A108, AISI C-1018.

2.6 SLIDE BEARINGS

A. Structural Slide Bearings: Low-friction assemblies, of configuration indicated, that provide vertical transfer of loads and allow horizontal movement perpendicular to plane of expansion joint while resisting movement within plane of expansion joint.

1. Mating Surfaces: As indicated on drawings or, at minimum PTFE and mirror-finished stainless steel.
2. Coefficient of Friction: As indicated on drawings or, at minimum, not more than 0.06.
3. Design Load: As indicated on drawings.
4. Total Movement Capability: As indicated on drawings or, at minimum 2 inches.

2.7 PRIMER

A. Steel Primer:

1. Comply with Section 09 91 13 "Exterior Painting," Section 09 91 23 "Interior Painting," and/or Section 09 96 00 "High-Performance Coatings."
2. SSPC-Paint 23, latex primer.
3. Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

B. Galvanized-Steel Primer: MPI #80,.

1. Etching Cleaner: MPI#25, for galvanized steel.
2. Galvanizing Repair Paint: MPI#18, MPI#19, or SSPC-Paint 20.

2.8 SHRINKAGE-RESISTANT GROUT

A. Metallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, metallic aggregate grout, mixed with water to consistency suitable for application and a 30-minute working time.

B. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.9 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate in accordance with ANSI/AISC 303 and to ANSI/AISC 360.

1. Camber structural-steel members where indicated.
2. Fabricate beams with rolling camber up.
3. Identify high-strength structural steel in accordance with ASTM A6/A6M and maintain markings until structural-steel framing has been erected.
4. Mark and match-mark materials for field assembly.
5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

C. Bolt Holes: Cut, drill, mechanically thermal cut, or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted in accordance with SSPC-SP 2 minimum.

F. Shear Stud Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Weld using automatic end welding of headed-stud shear connectors in accordance with AWS D1.1/D1.1M and manufacturer's written instructions.

G. Steel Wall-Opening Framing: Select true and straight members for fabricating steel wall-opening framing to be attached to structural-steel frame. Straighten as required to provide uniform, square, and true members in completed wall framing. Build up welded framing, weld exposed joints continuously, and grind smooth.

H. Welded-Steel Door Frames: Build up welded-steel door frames attached to structural-steel frame. Weld exposed joints continuously and grind smooth. Plug-weld fixed steel bar stops to frames. Secure removable stops to frames with countersunk machine screws, uniformly spaced not more than 10 inches o.c. unless otherwise indicated on Drawings.

I. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.

1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.10 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened, Pretensioned or Slip critical as indicated.

B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.

2.11 PREFABRICATED BUILDING COLUMNS

A. Prefabricated building columns, consisting of load-bearing structural-steel members protected by concrete fireproofing encased in an outer non-load-bearing steel shell.

B. Fire-Resistance Ratings: Provide prefabricated building column listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for ratings indicated, based on testing in accordance with ASTM E119.

1. Fire-Resistance Design: UL Design No. as indicated on drawings.
2. Fire-Resistance Rating: As indicated on drawings.

2.12 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel in accordance with ASTM A123/A123M.

1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.
2. Galvanize lintels shelf angles and welded door frames attached to structural-steel frame and located in exterior walls.

2.13 SHOP PRIMING

A. Shop prime steel surfaces, except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
2. Surfaces to be field welded.

3. Surfaces of high-strength bolted, slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
5. Galvanized surfaces [unless indicated to be painted].
6. Corrosion-resisting (weathering) steel surfaces.
7. Surfaces enclosed in interior construction.

B. Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:

1. SSPC-SP 2.
2. SSPC-SP 3.
3. SSPC-SP 7 (WAB)/NACE WAB-4.
4. SSPC-SP 14 (WAB)/NACE WAB-8.
5. SSPC-SP 11.
6. SSPC-SP 6 (WAB)/NACE WAB-3.
7. SSPC-SP 10 (WAB)/NACE WAB-2.
8. SSPC-SP 5 (WAB)/NACE WAB-1.
9. SSPC-SP 8.

C. Surface Preparation of Galvanized Steel: Prepare galvanized-steel surfaces for shop priming by thoroughly cleaning steel of grease, dirt, oil, flux, and other foreign matter, and treating with etching cleaner or in accordance with SSPC-SP 16.

D. Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

2.14 SOURCE QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform shop tests and inspections.

1. Allow testing agency access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
2. Bolted Connections: Inspect and test shop-bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
3. Welded Connections: Visually inspect shop-welded connections in accordance with AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
    a. Liquid Penetrant Inspection: ASTM E165/E165M.
    b. Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
    c. Ultrasonic Inspection: ASTM E164.

d. Radiographic Inspection: ASTM E94/E94M.

4. In addition to visual inspection, test and inspect shop-welded shear stud connectors in accordance with requirements in AWS D1.1/D1.1M for stud welding and as follows:

   a. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear stud connector.

   b. Conduct tests in accordance with requirements in AWS D1.1/D1.1M on additional shear stud connectors if weld fracture occurs on shear stud connectors already tested.

5. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated on Drawings.

1. Do not remove temporary shoring supporting composite deck construction and structural-steel framing until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and in accordance with ANSI/AISC 303 and ANSI/AISC 360.

B. Baseplates Bearing Plates and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

1. Set plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of baseplate.
3. Snug-tighten or Pretension anchor rods as indicated after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.

4. Promptly pack shrinkage-resistant grout solidly between bearing surfaces and plates, so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for grouting.

C. Maintain erection tolerances of structural steel within ANSI/AISC 303.

D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure. Slope roof framing members to slopes indicated on Drawings.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

E. Splice members only where indicated.

F. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M].

G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt and joint type specified.

1. Joint Type: Snug tightened, Pretensioned or Slip critical as indicated.

B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with ANSI/AISC 303 and ANSI/AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Remove backing bars or runoff tabs where indicated, back gouge, and grind steel smooth.
3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.

3.5 INSTALLATION OF PREFABRICATED BUILDING COLUMNS

A. Install prefabricated building columns to comply with ANSI/AISC 360, manufacturer's written recommendations, and requirements of testing and inspecting agency that apply to the fire-resistance rating indicated.

3.6 REPAIR

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing, and repair galvanizing to comply with ASTM A780/A780M.

B. Touchup Painting:

1. Immediately after erection, clean exposed areas where primer is damaged or missing, and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
    a. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

C. Touchup Priming: Cleaning and touchup priming are specified in Section 09 96 00 "High-Performance Coatings."

3.7 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector to perform the following special inspections:
1. Verify structural-steel materials and inspect steel frame joint details.
2. Verify weld materials and inspect welds.
3. Verify connection materials and inspect high-strength bolted connections.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
1. Bolted Connections: Inspect and test bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
2. Welded Connections: Visually inspect field welds in accordance with AWS D1.1/D1.1M.
    a. In addition to visual inspection, test and inspect field welds in accordance with AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
        1) Liquid Penetrant Inspection: ASTM E165/E165M.
        2) Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
        3) Ultrasonic Inspection: ASTM E164.
        4) Radiographic Inspection: ASTM E94/E94M.

END OF SECTION 05 12 00

SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Steel framing and supports for countertops.
   2. Steel tube reinforcement for low partitions.
   3. Prefabricated building columns.

1.3 COORDINATION

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

B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

A. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections as required for full clarity. Show anchorage and accessory items. Provide Shop Drawings for the following:
   1. Steel framing and supports for countertops.
   2. Steel tube reinforcement for low partitions.
   3. Prefabricated building columns.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For professional engineer's experience with providing delegated-design engineering services of the kind indicated, including documentation that engineer is licensed in the jurisdiction in which Project is located.

B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.7 FIELD CONDITIONS

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

PART 2 - PRODUCTS

2.1 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. Stainless Steel Sheet, Strip, and Plate: ASTM A240/A240M or ASTM A666, Type 304 or Type 316L.

D. Stainless Steel Bars and Shapes: ASTM A276/A276M, Type 304 or Type 316L.

E. Rolled-Steel Floor Plate: ASTM A786/A786M, rolled from plate complying with ASTM A36/A36M or ASTM A283/A283M, Grade C or D.

F. Rolled-Stainless Steel Floor Plate: ASTM A793.

G. Abrasive-Surface Floor Plate: Steel plate with abrasive material metallically bonded to steel.

1. Source Limitations: Obtain floor plate from single source from single manufacturer.

H. Steel Tubing: ASTM A500/A500M, cold-formed steel tubing.

I. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.

J. Zinc-Coated Steel Wire Rope: ASTM A741.

1. Wire Rope Fittings: Hot-dip galvanized-steel connectors with capability to sustain, without failure, a load equal to minimum breaking strength of wire rope with which they are used.

K. Stainless Steel Wire Rope: Wire rope manufactured from stainless steel wire complying with ASTM A492, Type 316.

1. Wire Rope Fittings: Stainless steel connectors, Type 316, with capability to sustain, without failure, a load equal to minimum breaking strength of wire rope with which they are used.

L. Steel Prestressing Strand: ASTM A416/A416M, Grade 270, low-relaxation, seven-wire, with 0.9-lb/sq. ft. zinc coating.

1. Steel Prestressing Strand Fittings: Hot-dip galvanized-steel anchors and connectors with capability to sustain, without failure, a load equal to minimum breaking strength of steel prestressing strand with which they are used.

M. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.

1. Size of Channels: As indicated.
2. Material: Galvanized steel, ASTM A653/A653M, commercial steel, Type B, with G90 coating; 0.079-inch nominal thickness unless otherwise indicated.
3. Material: Cold-rolled steel, ASTM A1008/A1008M, commercial steel, Type B; 0.0677-inch minimum thickness; hot-dip galvanized after fabrication.

N. Cast Iron: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M, unless otherwise indicated.

O. Aluminum Plate and Sheet: ASTM B209, Alloy 6061-T6.

P. Aluminum Extrusions: ASTM B221, Alloy 6063-T6.

Q. Aluminum-Alloy Rolled Tread Plate: ASTM B632/B632M, Alloy 6061-T6.

R. Aluminum Castings: ASTM B26/B26M, Alloy 443.0-F.

S. Bronze Extrusions: ASTM B455, Alloy UNS No. C38500 (extruded architectural bronze).

T. Bronze Castings: ASTM B584, Alloy UNS No. C83600 (leaded red brass) or UNS No. C84400 (leaded semired brass).

U. Nickel Silver Extrusions: ASTM B151/B151M, Alloy UNS No. C74500.

V. Nickel Silver Castings: ASTM B584, Alloy UNS No. C97600 (20 percent leaded nickel bronze).

2.2 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 or Type 316 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.

1. Provide stainless steel fasteners for fastening aluminum, stainless steel or nickel silver.
2. Provide bronze fasteners for fastening bronze.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and, where indicated, flat washers.

C. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 3, heavy-hex steel structural bolts; ASTM A563, Grade DH3, heavy-hex carbon-steel nuts; and where indicated, flat washers.

D. Stainless Steel Bolts and Nuts: Regular hexagon-head annealed stainless steel bolts, ASTM F593; with hex nuts, ASTM F594; and, where indicated, flat washers; Alloy Group 2.

E. 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.

F. 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.

G. 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.

H. Post-Installed Anchors: As indicated on the drawings.

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 2 stainless steel bolts, ASTM F593, and nuts, ASTM F594.

I. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches by length indicated with anchor straps or studs not less than 3 inches long at not more than 8 inches o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B633, Class Fe/Zn 5, as needed for fastening to inserts.

2.3 MISCELLANEOUS MATERIALS

A. Shop Primers: Provide primers that comply with [Section 09 91 13 "Exterior Painting."] [Section 09 91 23 "Interior Painting."] [Section 09 96 00 "High-Performance Coatings."] [Section 09 91 13 "Exterior Painting," Section 09 91 23 "Interior Painting," and Section 09 96 00 "High-Performance Coatings."]

B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

C. Water-Based Primer: Emulsion type, anticorrosive primer for mildly corrosive environments that is resistant to flash rusting when applied to cleaned steel, complying with MPI#107 and compatible with topcoat.

D. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

E. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

F. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

G. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

H. 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.

I. Concrete: Comply with requirements in Section 03 30 00 "Cast-in-Place Concrete" for normal-weight, air-entrained concrete with a minimum 28-day compressive strength of 3000 psi.

2.4 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.

2.5 MISCELLANEOUS FRAMING AND SUPPORTS

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

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

1. Fabricate units from slotted channel framing where indicated.
2. Furnish inserts for units installed after concrete is placed.

C. Fabricate supports for operable partitions from continuous steel beams of sizes indicated or recommended by partition manufacturer with attached bearing plates, anchors, and braces as indicated or recommended by partition manufacturer. Drill or punch bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.

D. 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.

E. Fabricate steel pipe columns for supporting wood frame construction from steel pipe with steel baseplates and top plates as indicated. Drill or punch baseplates and top plates for anchor and connection bolts and weld to pipe with fillet welds all around. Make welds the same size as pipe wall thickness unless otherwise indicated.

1. Unless otherwise indicated, fabricate from Schedule 40 steel pipe.
2. Unless otherwise indicated, provide 1/2-inch baseplates with four 5/8-inch anchor bolts and 1/4-inch top plates.

F. Galvanize miscellaneous framing and supports where indicated.

G. Prime miscellaneous framing and supports with [zinc-rich primer] [primer specified in Section 09 96 00 "High-Performance Coatings"] where indicated.

2.6 PREFABRICATED BUILDING COLUMNS

A. Source Limitations: Obtain prefabricated building column from single source from single manufacturer.

B. General: Provide prefabricated building columns consisting of load-bearing structural-steel members protected by concrete fireproofing encased in an outer non-load-bearing steel shell. Fabricate connections to comply with details shown or as needed to suit type of structure indicated.

2.7 PONYWALL SUPPORTS

A. Fabricate metal ponywall supports as indicated on drawings or, at minimum, equal to SCAFCO ponywall support system.

2.8 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.

2.9 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.

1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean galvanized surfaces of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.

C. Shop prime iron and steel items 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.

D. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:

1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
3. Items Indicated to Receive Primers Specified in Section 09 96 00 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
4. Other Steel Items: SSPC-SP 3, "Power Tool Cleaning."
5. Galvanized-Steel Items: SSPC-SP 16, "Brush-off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals."

E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

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.

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 ceiling hung toilet partitions, operable partitions, overhead doors and/or overhead grilles securely to, and rigidly brace from, building structure.

C. Anchor shelf angles securely to existing construction with anchor bolts suitable for construction and capable of resisting standard loads minimum.

D. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.

1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.

E. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installation of Bearing and Leveling Plates" Article.

1. Grout baseplates of columns supporting steel girders after girders are installed and leveled.

3.3 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.
2. Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 09 91 13 "Exterior Painting." And Section 09 91 23 "Interior Painting."

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION 05 50 00

SECTION 05 52 13 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Steel **exterior** railings.

1.3 COORDINATION

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

B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

A. Product Data:

1. Manufacturer's product lines of mechanically connected railings.
2. Fasteners.
3. Post-installed anchors.
4. Handrail brackets.
5. Shop primer.
6. Intermediate coats and topcoats.
7. Bituminous paint.
8. Nonshrink, nonmetallic grout.
9. Anchoring cement.
10. Metal finishes.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

C. Samples for Initial Selection: For products involving selection of color, texture, or design**,** including mechanical finishes where present.

D. Samples for Verification: For each type of exposed finish required.

1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters, including finish.
2. Fittings and brackets.
3. Assembled Sample of railing system, made from full-size components, including top rail, post, handrail, and infill. Sample need not be full height.

a. Show method of connecting and finishing members at intersections.

E. Delegated-Design Submittal: For railings, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

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 DELIVERY, STORAGE, AND HANDLING

A. Protect mechanical finishes on exposed surfaces of railings from damage by applying a strippable, temporary protective covering before shipping.

1.7 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design railings, including attachment to building construction.

B. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Handrails and Top Rails of Guards:

a. Uniform load of 50 lbf/ ft. applied in any direction.
b. Concentrated load of 200 lbf applied in any direction.
c. Uniform and concentrated loads need not be assumed to act concurrently.

2. Infill of Guards:

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

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

1. 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.

2.3 STEEL RAILINGS

A. Source Limitations: Obtain each type of railing from single source from single manufacturer.

B. Tubing: ASTM A500/A500M (cold formed) or ASTM A513/A513M, Type 5.

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

1. Provide galvanized finish for exterior installations and where indicated.

D. Plates, Shapes, and Bars: ASTM A36/A36M.

E. Cast Iron Fittings: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M, unless otherwise indicated.

1. Basis-of-Design Product: Provide product with crimp pattern matching product indicated on Drawings.

2.4 FASTENERS

A. Fastener Materials:

1. Ungalvanized-Steel Railing Components: Plated steel fasteners complying with ASTM F1941, Class Fe/Zn 5 for zinc coating.

2. Hot-Dip Galvanized Railing Components: Type 304 stainless steel or hot-dip zinc-coated steel fasteners complying with ASTM A153/A153M or ASTM F2329/F2329M for zinc coating.

3. Finish exposed fasteners to match appearance, including color and texture, of railings.

B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction and capable of withstanding design loads.

C. Fasteners for Interconnecting Railing Components:

1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
2. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for railings indicated.
3. Provide tamper-resistant flat-head machine screws for exposed fasteners unless otherwise indicated.

D. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 or ICC-ES AC308.

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.

2.5 MISCELLANEOUS MATERIALS

A. Handrail Brackets: Cast iron, Cast aluminum, Cast stainless steel or Cast nickel-silver, center of handrail 3-1/8 inches from face of railing or wall.

B. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for metal alloy welded.

C. Etching Cleaner for Galvanized Metal: Complying with MPI#25.

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. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

F. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout, complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

G. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.

1. Water-Resistant Product: At exterior locations and where indicated on Drawings, provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.6 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations.

1. Clearly mark units for reassembly and coordinated installation.
2. Use connections that maintain structural value of joined pieces.

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 work true to line and level with accurate angles and surfaces.

E. Fabricate connections that are exposed to weather in a manner that excludes water.

1. Provide weep holes where water may accumulate.
2. Locate weep holes in inconspicuous locations.

F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

G. Connections: Fabricate railings with welded connections unless otherwise indicated.

H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove flux immediately.
4. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Finish #2 welds; good appearance, completely sanded joint, some undercutting and pinholes.

I. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

1. Fabricate splice joints for field connection, using an epoxy structural adhesive, if this is manufacturer's standard splicing method.

J. Form changes in direction as follows:

1. As detailed.
2. By bending to smallest radius that will not result in distortion of railing member.

K. Bend members in jigs to produce uniform curvature for each configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

L. Close exposed ends of hollow railing members with prefabricated cap and end fittings of same metal and finish as railings.

M. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.

N. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.

O. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work.

1. Fabricate anchorage devices capable of withstanding loads imposed by railings.
2. Coordinate anchorage devices with supporting structure.

P. For railing posts set in concrete, provide stainless steel sleeves not less than 6 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with metal plate forming bottom closure.

Q. For removable railing posts, fabricate slip-fit sockets from stainless steel tube or pipe whose ID is sized for a close fit with posts; limit movement of post without lateral load, measured at top, to not more than one-fortieth of post height.

1. Provide socket covers designed and fabricated to resist being dislodged.

2. Provide chain with eye, snap hook, and staple across gaps formed by removable railing sections at locations indicated. Fabricate from same metal as railings.

2.7 STEEL AND IRON FINISHES

A. Galvanized Railings:

1. Hot-dip galvanize exterior steel railings, including hardware, after fabrication.
2. Comply with ASTM A123/A123M for hot-dip galvanized railings.
3. Comply with ASTM A153/A153M for hot-dip galvanized hardware.
4. Do not quench or apply post-galvanizing treatments that might interfere with paint adhesion.
5. Fill vent and drain holes that are exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.

B. For galvanized railings, provide hot-dip galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.

C. Preparing Galvanized Railings for Shop Priming: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner and as follows.

1. Comply with SSPC-SP 16.

D. For nongalvanized-steel railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves; however, hot-dip galvanize anchors to be embedded in exterior concrete or masonry.

E. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with requirements indicated below:

1. Exterior Railings: SSPC-SP 6/NACE No. 3.
2. Railings Indicated To Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3.
3. Railings Indicated To Receive Primers Specified in Section 09 96 00 "High-Performance Coatings": SSPC-SP 6/NACE No. 3.
4. Other Railings: SSPC-SP 3.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements are clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

A. Perform cutting, drilling, and fitting required for installing railings.

1. Fit exposed connections together to form tight, hairline joints.

2. Install railings level, plumb, square, true to line; without distortion, warp, or rack.
3. Set railings accurately in location, alignment, and elevation; measured from established lines and levels.

4. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
5. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
6. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1. Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

C. Adjust railings before anchoring to ensure matching alignment at abutting joints.

D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Use wood blocks and padding to prevent damage to railing members and fittings. Seal recessed holes of exposed locking screws, using plastic cement filler colored to match finish of railings.

B. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article, whether welding is performed in the shop or in the field.

C. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve, extending 2 inches beyond joint on either side; fasten internal sleeve securely to one side; and locate joint within 6 inches of post.

3.4 ANCHORING POSTS

A. Use stainless steel pipe sleeves preset and anchored into concrete for installing posts. After posts are inserted into sleeves, fill annular space between post and sleeve with non-shrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.

B. Form or core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with non-shrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.

C. Cover anchorage joint with flange of same metal as post, [welded to post after placing anchoring material] [attached to post with setscrews].

D. Leave anchorage joint exposed with 1/8-inch buildup, sloped away from post.

E. Anchor posts to metal surfaces with flanges, angle type, or floor type, as required by conditions, connected to posts and to metal supporting members as follows:

1. For steel railings, weld flanges to post and bolt to metal supporting surfaces.
2. For aluminum railings, attach posts as indicated, using fittings designed and engineered for this purpose.
3. For stainless steel railings, weld flanges to post and bolt to supporting surfaces.

F. Install removable railing sections, where indicated, in slip-fit stainless steel sockets cast in concrete.

3.5 ATTACHING RAILINGS

A. Anchor railing ends to concrete and masonry with flanges connected to and with brackets on underside of rails connected to railing ends and anchored to wall construction with anchors and bolts.

B. Attach handrails to walls with wall brackets**,** except where end flanges are used. Provide brackets with 1-1/2-inch min. clearance from inside face of handrail and finished wall surface.

1. Use type of bracket with predrilled hole for exposed bolt anchorage.
2. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

C. Secure wall brackets and railing end flanges to building construction as follows:

1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
2. For hollow masonry anchorage, use toggle bolts.
3. 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.
4. For steel-framed partitions, use hanger or lag bolts set into fire-retardant-treated wood backing between studs. Coordinate with stud installation to locate backing members.
5. For steel-framed partitions, fasten brackets directly to steel framing or concealed steel reinforcements, using self-tapping screws of size and type required to support structural loads.
6. For steel-framed partitions, use toggle bolts installed through flanges of steel framing or through concealed steel reinforcements.

3.6 REPAIR

A. Touchup Painting:

1. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material 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. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 09 91 13 "Exterior Painting," Section 09 91 23 "Interior Painting," or Section 09 96 00 "High-Performance Coatings."

3.7 CLEANING

A. Clean aluminum and/or stainless steel by washing thoroughly with clean water and soap and rinsing with clean water.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas, and repair galvanizing to comply with ASTM A780/A780M.

3.8 PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

B. Restore finishes damaged during installation and construction period, so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 05 52 13

SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Framing with dimensional lumber.
2. Framing with Engineered Wood Products/Structural Composite Lumber.
3. Shear wall panels.
4. Wood blocking**,** cants, and nailers.
5. Wood furring and grounds.
6. Wood sleepers.
7. Metal framing anchors.

B. Related Requirements:
1. Section 06 16 00 "Sheathing" for sheathing, subflooring, and underlayment.

1.3 DEFINITIONS

A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.

B. Dimensional Lumber: Lumber of 2 inches nominal size or greater but less than 5 inches nominal size in least dimension.

C. Exposed Framing: Framing not concealed by other construction.

D. OSB: Oriented strand board.

E. Timber: Lumber of 5 inches nominal size or greater in least dimension.

F. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NeLMA: Northeastern Lumber Manufacturers' Association.
2. NLGA: National Lumber Grades Authority.
3. RIS: Redwood Inspection Service.
4. SPIB: The Southern Pine Inspection Bureau.
5. WCLIB: West Coast Lumber Inspection Bureau.
6. WWPA: Western Wood Products Association.

1.4 REGULATORY REQUIREMENTS

A. Arrange and schedule special testing and inspection, conforming to Division 1 Section Testing, Special Inspections and Laboratory Services, IBC Chapter 17 and requirements of Authority Having Jurisdiction.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5664.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

B. Fastener Patterns: Shop drawings for fasteners in exposed framing.

1.6 INFORMATIONAL SUBMITTALS

A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

1.7 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

B. Source Limitations for Engineered Wood Products/Structural Composite Lumber: Obtain each type of engineered wood product through one source from a single manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Stack wood products flat with spacers beneath and between each bundle to provide air circulation.

B. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. Dress lumber, S4S, unless otherwise indicated.
4. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.

B. Maximum Moisture Content of Lumber: 15 percent unless otherwise indicated.

C. Engineered Wood Products/Structural Composite Lumber: 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.

1. Allowable design stresses, as published by manufacturer, shall meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
2. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.

D. Application: Treat items indicated on Drawings, where required by Code, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Treatment shall not promote corrosion of metal fasteners.
2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D2898. Use for exterior locations and where indicated.
3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201 at 92 percent relative humidity. Use where exterior type is not indicated.
4. Interior Type A, High Temperature (HT): Use for enclosed roof framing, framing in attic spaces, and where indicated.

C. Kiln-dry lumber after treatment to maximum moisture content of 15 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by testing agency.

E. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not bleed through, contain colorants, or otherwise adversely affect finishes.

F. Application: Treat items indicated on Drawings, where required by Code, and the following:
   1. Plywood backing panels for surface mounted electrical.

2.4 DIMENSIONAL LUMBER FRAMING

A. Non-Load-Bearing Interior Partitions: Construction or No. 2 grade or better.
   1. Application: Interior partitions not indicated as load bearing.
   2. Species:

      a. Hem-fir (north); NLGA.
      b. Spruce-pine-fir; NLGA.
      c. Hem-fir; WCLIB, or WWPA.
      d. Northern species; NLGA.
      e. Western woods; WCLIB or WWPA.

B. Load-Bearing Partitions: Per Structural drawings, or at minimum, construction or No. 2 grade.
   1. Application: Exterior walls and interior load-bearing partitions.
   2. Species:

      a. Hem-fir (north); NLGA.
      b. Douglas fir-larch; WCLIB or WWPA.
      c. Spruce-pine-fir; NLGA.
      d. Hem-fir; WCLIB or WWPA.
      e. Douglas fir-larch (north); NLGA.

C. Load-Bearing Partitions: Any species of machine stress-rated dimension lumber with a grade of not less than what is called out on structural drawings.

   1. Application: Exterior walls and interior load-bearing partitions.

D. Ceiling Joists: Per Structural drawings, or at minimum, construction or No. 2 grade.

   1. Species:

      a. Hem-fir (north); NLGA.
      b. Douglas fir-larch; WCLIB or WWPA.
      c. Douglas fir-larch (north); NLGA.
      d. Spruce-pine-fir; NLGA.
      e. Hem-fir; WCLIB or WWPA.
      f. Northern species; NLGA.
      g. Western woods; WCLIB or WWPA.

E. Joists, Rafters, and Other Framing Not Listed Above: Per Structural drawings, or at minimum, Select Structural, No. 1, No. 2 or Construction grade.

1. Species:

    a. Hem-fir (north); NLGA.
    b. Douglas fir-larch; WCLIB or WWPA.
    c. Spruce-pine-fir; NLGA.
    d. Hem-fir; WCLIB or WWPA.
    e. Douglas fir-larch (north); NLGA.

F. Exposed Framing including that indicated to Receive a Stained or Natural Finish: Hand-select material 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.

1. Species and Grade: As indicated above for load-bearing construction of same type unless otherwise called out on plans.

2.5 ENGINEERED WOOD PRODUCTS/STRUCTURAL COMPOSITE LUMBER

A. Source Limitations: Obtain each type of engineered wood product from single source from a single manufacturer.

B. Laminated Strand Lumber: Structural composite lumber made from flaked wood with flakes primarily parallel to member lengths. Evaluated and monitored according to ASTM D 5456 and manufactured with an exterior-type adhesive complying with ASTM D 2559 and containing no urea formaldehyde.

1. As called out on Structural or Architectural drawings.

C. Laminated-Veneer Lumber: Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D5456 and manufactured with an exterior-type adhesive complying with ASTM D2559.

1. As called out on Structural or Architectural drawings.

D. Parallel-Strand Lumber: Structural composite lumber made from wood strand elements with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D5456 and manufactured with an exterior-type adhesive complying with ASTM D2559.

1. As called out on Structural or Architectural drawings.

E. Wood I-Joists: Prefabricated units, I-shaped in cross section, made with solid or structural composite lumber flanges and wood-based structural panel webs, let into and bonded to flanges. Comply with material requirements of and with structural capacities established and monitored according to ASTM D5055.

1. As called out on Structural or Architectural drawings

2. Web Material: Either OSB or plywood, complying with DOC PS 1 or DOC PS 2, Exposure 1.

3. Structural Properties: Depths and design values not less than those indicated.

F. Rim Boards: Product designed to be used as a load-bearing member and to brace wood I-joists at bearing ends, complying with research or evaluation report for I-joists.

1. Manufacturer: Provide products by same manufacturer as I-joists.
2. Material: All-veneer product, glued-laminated wood or] product made from any combination solid lumber, wood strands, and veneers.
3. Thickness: Per drawings, or at minimum, 1-1/4 inches.

G. Insulated Rim Boards: Insulated product designed to be used as a load-bearing member and to brace wood I-joists at bearing ends, complying with research/evaluation report for I-joists.

1. Manufacturer: Provide products by same manufacturer as I-joists.
2. Rim Board Material: All-veneer product, glued-laminated wood or product made from any combination solid lumber, wood strands, and veneers.
3. Rim Board Thickness: As indicated on drawings.
4. Insulation: As indicated on drawings.
5. Inside Facing: Minimum 7/16-inch-thick OSB.

2.6 STRUCTURAL COMPOSITE LUMBER

A. Laminated Strand Lumber: Structural composite lumber made from flaked wood with flakes primarily parallel to member lengths. Evaluated and monitored according to ASTM D 5456 and manufactured with an exterior-type adhesive complying with ASTM D 2559 and containing no urea formaldehyde.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Redbuilt.
b. Weyerhaeuser.
c. Substitutions: See Division 1.

2.7 TONGUE AND GROOVE DECKING

A. Maximum Moisture Content: 15 percent.

B. Species and Grade: Douglas fir-Larch; Select.

C. Nominal Sizes: See Drawings.

D. Face Surface: Smooth.

E. Edge Pattern: V-grooved.

2.8 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Cants.

4. Furring.
5. Grounds.

B. Dimensional Lumber Items: Per drawings, or at minimum, construction or No. 2 grade.

1. Hem-fir (north); NLGA.
2. Spruce-pine-fir; NLGA.
3. Hem-fir; WCLIB or WWPA.
4. Western woods; WCLIB or WWPA.

C. Concealed Boards: 15 percent maximum moisture content and any of the following species and grades unless otherwise called out on plans:

1. Hem-fir or hem-fir (north); Construction or No. 2 Common grade; NLGA, WCLIB, or WWPA.
2. Spruce-pine-fir; Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
3. Northern species; No. 2 Common grade; NLGA.
4. Western woods; Construction or No. 2 Common grade; WCLIB or WWPA.

D. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.9 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: As indicated on the drawings, or at min., Plywood, DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated at electrical, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.10 FASTENERS

A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M or of Type 304 stainless steel.

B. Nails, Brads, and Staples: ASTM F1667.

C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

D. Wood Screws: ASME B18.6.1.

E. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).

F. Expansion Anchors: ASTM E 488. Carbon-steel components, zinc plated to comply with ASTM B633, Class Fe/Zn 5.

G. Epoxy Anchors: Anchors; “All thread,” ASTM A36. Grout: Master Builders “Paste LPL” or Hilti “HY-150”.

H. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, ICC-ES AC58, ICC-ES AC193 or ICC-ES AC308 as appropriate for the substrate.

2.11 METAL FRAMING ANCHORS

A. Allowable design loads, as published by manufacturer, shall meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.

B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653/A653M, G60 coating designation.

1. Use for interior locations unless otherwise indicated.

C. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A653/A653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.

1. Use for wood-preservative-treated lumber and where indicated.

D. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666.

1. Use for exterior locations and where indicated.

E. Joist Hangers: U-shaped joist hangers with 2-inch-long seat and 1-1/4-inch-wide nailing flanges at least 85 percent of joist depth.

1. Thickness: As indicated on drawings or, at minimum, 0.062 inch.

F. I-Joist Hangers: U-shaped joist hangers with 2-inch-long seat and 1-1/4-inch-wide nailing flanges full depth of joist. Nailing flanges provide lateral support at joist top chord.

1. Thickness: As indicated on drawings or, at minimum, 0.062 inch.

G. Top Flange Hangers: U-shaped joist hangers, full depth of joist, formed from metal strap with tabs bent to extend over and be fastened to supporting member.

1. Strap Width: As indicated on drawings or, at minimum, 2 inches.
2. Thickness: As indicated on drawings or, at minimum, 0.062 inch.

H. Bridging: Rigid, V-section, nailless type, 0.050 inch thick, length to suit joist size and spacing.

I. Post Bases: Adjustable-socket type for bolting in place with standoff plate to raise post 1 inch above base and with 2-inch-minimum side cover, socket 0.062 inch thick, and standoff and adjustment plates 0.108 inch thick.

J. Joist Ties: Flat straps, with holes for fasteners, for tying joists together over supports.

1. Width: As indicated on drawings or, at minimum, 1-1/4 inches.
2. Thickness: As indicated on drawings or, at minimum, 0.062 inch.
3. Length: As indicated on drawings or, at minimum,24 inches.

K. Rafter Tie-Downs: Bent strap tie for fastening rafters or roof trusses to wall studs below, 1-1/2 inches wide by 0.050 inch thick. Unless otherwise indicated, tie fastens to side of rafter or truss, face of top plates, and side of stud below.

L. Rafter Tie-Downs (Hurricane or Seismic Ties): Bent strap tie for fastening rafters or roof trusses to wall studs below, 2-1/4 inches wide by 0.062 inch thick. Tie fits over top of rafter or truss and fastens to both sides of rafter or truss, face of top plates, and side of stud below.

M. Floor-to-Floor Ties: Flat straps, with holes for fasteners, for tying upper floor wall studs to band joists and lower floor studs, 1-1/4 inches wide by 0.050 inch thick by 36 inches long.

N. Hold-Downs: Brackets for bolting to wall studs and securing to foundation walls with anchor bolts or to other hold-downs with threaded rods and designed with first of two bolts placed seven bolt diameters from reinforced base.

1. Bolt Diameter: As indicated on drawings or, at minimum,3/4 inch.
2. Width: As indicated on drawings or, at minimum,3-3/16 inches.
3. Body Thickness: As indicated on drawings or, at minimum,0.138 inch.
4. Base Reinforcement Thickness: As indicated on drawings or, at minimum,0.239 inch.

O. Wall Bracing: T-shaped bracing made for letting into studs in saw kerf, 1-1/8 inches wide by 9/16 inch deep by 0.034 inch thick with hemmed edges.

P. Wall Bracing: Angle bracing made for letting into studs in saw kerf, 15/16 by 15/16 by 0.040 inch thick with hemmed edges.

2.12 MISCELLANEOUS MATERIALS

A. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.

B. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

C. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D3498 that is approved for use indicated by adhesive manufacturer.

D. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

C. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

D. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Where indicated install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.

E. Install shear wall panels to comply with manufacturer's written instructions.

F. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

G. Install sill sealer gasket to form continuous seal between sill plates and foundation walls.

H. Do not splice structural members between supports unless otherwise indicated.

I. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.

J. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.

2. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. and to solidly fill space below partitions.

K. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

L. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

M. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with one of the following:

1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
2. ICC-ES evaluation report for fastener.

N. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

O. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.

1. Comply with indicated and approved fastener patterns where applicable. Before fastening, mark fastener locations, using a template made of sheet metal, plastic, or cardboard.
2. Use finishing nails unless otherwise indicated. Countersink nail heads and fill holes with wood filler.
3. Use common nails unless otherwise indicated. Drive nails snug but do not countersink nail heads.

3.2 INSTALLATION OF WOOD BLOCKING AND NAILERS

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

3.3 INSTALLATION OF WOOD FURRING

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

B. Furring to Receive Plywood or Hardboard Paneling: Install 1-by-3-inch nominal-size furring. Furring orientation and spacing as indicated on plans.

C. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal-size furring at 16 inches o.c.

3.4 INSTALLATION OF WALL AND PARTITION FRAMING

A. General: Provide single bottom plate and double top plates using members of 2-inch nominal thickness whose widths equal that of studs, except single top plate may be used for non-load-bearing partitions. Fasten plates to supporting construction unless otherwise indicated. Oversized plates may be used at staggered stud walls as indicated on drawings.

1. For exterior walls, provide wood studs with stud width and spacing as indicated on the drawings.
2. For interior partitions and walls, provide wood studs with stud width and spacing as indicated on the drawings.
3. Provide continuous horizontal blocking at midheight of partitions more than 96 inches high, using members of 2-inch nominal thickness and of same width as wall or partitions.

B. Construct corners and intersections with three or more studs.

C. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Support headers on jamb studs.

1. For non-load-bearing partitions, provide double-jamb studs and headers not less than 4-inch nominal depth for openings 48 inches and less in width, 6-inch nominal depth for openings 48 to 72 inches in width, 8-inch nominal depth for openings 72 to 120 inches in width, and not less than 10-inch nominal depth for openings 10 to 12 feet in width.
2. For load-bearing walls, provide double-jamb studs for openings 60 inches and less in width, and triple-jamb studs for wider openings. Provide headers of depth indicated on drawings**.**

3.5 INSTALLATION OF FLOOR JOIST FRAMING

A. Install per structural if indicated

B. General: Install floor joists with crown edge up and support ends of each member with not less than 1-1/2 inches of bearing on wood or metal, or 3 inches on masonry. Attach floor joists as follows:

1. Where supported on wood members, by toe nailing or by using metal framing anchors.
2. Where framed into wood supporting members, by using wood ledgers as indicated or, if not indicated, by using metal joist hangers.

C. Fire Cuts: At joists built into masonry, bevel cut ends 3 inches and do not embed more than 4 inches.

D. Frame openings with headers and trimmers supported by metal joist hangers; double headers and trimmers where span of header exceeds 48 inches.

E. Do not notch in middle third of joists; limit notches to one-sixth depth of joist, one-third at ends. Do not bore holes larger than one-third depth of joist; do not locate closer than 2 inches from top or bottom.

F. Provide solid blocking of 2-inch nominal thickness by depth of joist at ends of joists unless nailed to header or band.

G. Lap members framing from opposite sides of beams, girders, or partitions not less than 4 inches or securely tie opposing members together. Provide solid blocking of 2-inch nominal thickness by depth of joist over supports.

H. Anchor members paralleling masonry with 1/4-by-1-1/4-inch metal strap anchors spaced not more than 96 inches o.c., extending over and fastening to three joists. Embed anchors at least 4 inches into grouted masonry with ends bent at right angles and extending 4 inches beyond bend.

I. Provide solid blocking between joists under jamb studs for openings.

J. Under non-load-bearing partitions, provide double joists separated by solid blocking equal to depth of studs above.

1. Provide triple joists separated as above, under partitions receiving ceramic tile and similar heavy finishes or fixtures.

K. Provide bridging of type indicated below, at intervals of 96 inches o.c., between joists.

1. Diagonal wood bridging formed from bevel-cut, 1-by-3-inch nominal-size lumber, double-crossed and nailed at both ends to joists.
2. Steel bridging installed to comply with bridging manufacturer's written instructions.

3.6 INSTALLATION OF CEILING JOIST AND RAFTER FRAMING

A. Install per structural if indicated

B. Ceiling Joists: Install with crown edge up and complying with requirements specified above for floor joists. Face nail to ends of parallel rafters.

1. Where ceiling joists are at right angles to rafters, provide additional short joists parallel to rafters from wall plate to first joist; nail to ends of rafters and to top plate, and nail to first joist or anchor with framing anchors or metal straps. Provide 1-by-8-inch nominal-size or 2-by-4-inch nominal-size stringers spaced 48 inches o.c. crosswise over main ceiling joists.

C. Rafters: Notch to fit exterior wall plates and toe nail or use metal framing anchors. Double rafters to form headers and trimmers at openings in roof framing, if any, and support with

metal hangers. Where rafters abut at ridge, place directly opposite each other and nail to ridge member or use metal ridge hangers.

1. At valleys, provide double-valley rafters of size indicated or, if not indicated, of same thickness as regular rafters and 2 inches deeper. Bevel ends of jack rafters for full bearing against valley rafters.
2. At hips, provide hip rafter of size indicated or, if not indicated, of same thickness as regular rafters and 2 inches deeper. Bevel ends of jack rafters for full bearing against hip rafter.

D. Provide collar beams (ties) as indicated or, if not indicated, provide 1-by-6-inch nominal-size boards between every third pair of rafters, but not more than 48 inches o.c. Locate below ridge member, at third point of rafter span. Cut ends to fit roof slope and nail to rafters.

E. Provide special framing as indicated for eaves, overhangs, dormers, and similar conditions if any.

3.7 MISCELLANEOUS LUMBER

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

C. Install furring with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

3.8 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet enough that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06 10 00

SECTION 06 15 16 - WOOD ROOF DECKING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid-sawn wood roof decking.
2. Glue-laminated wood roof decking.

B. Related Requirements:

1. Section 06 10 00 "Rough Carpentry" for dimension lumber items associated with wood roof decking.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For glued-laminated wood roof decking, include installation instructions and data on lumber, adhesives, and fabrication.
2. For preservative-treated wood products, include chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.

1.3 INFORMATIONAL SUBMITTALS

A. Research/Evaluation Reports: For glued-laminated wood roof decking indicated to be of diaphragm design and construction, from ICC-ES.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Schedule delivery of wood roof decking to avoid extended on-site storage and to avoid delaying the Work.

B. Store materials under cover and protected from weather and contact with damp or wet surfaces. Provide for air circulation within and around stacks and under temporary coverings. Stack wood roof decking with surfaces that are to be exposed in the final Work protected from exposure to sunlight.

PART 2 - PRODUCTS

2.1 WOOD ROOF DECKING, GENERAL

A. General: Comply with DOC PS 20 and with applicable grading rules of inspection agencies certified by ALSC's Board of Review.

2.2 SOLID-SAWN WOOD ROOF DECKING

A. Standard for Solid-Sawn Wood Roof Decking: Comply with AITC 112.

B. Roof Decking Species:

1. Balsam fir, Douglas fir-larch, Douglas fir-larch (North), hem-fir, hem-fir (North), southern pine, spruce pine-fir (North), western hemlock, or western hemlock (North).

C. Roof Decking Nominal Size: 3 by 6 or as noted on plans.

D. Roof Decking Grade: Select.

E. Grade Stamps: Factory mark each item with grade stamp of grading agency. Apply grade stamp to surfaces that are not exposed to view.

F. Moisture Content: Provide wood roof decking with 19 percent maximum moisture content at time of dressing.

G. Face Surface: Smooth.

H. Edge Pattern: Channel grooved.

2.3 GLUED-LAMINATED WOOD ROOF DECKING

A. Face Species: Alaska cedar, Douglas fir-larch or Douglas fir-larch (North), Ponderosa pine

B. Roof Decking Nominal Size: 2 by 6 or 3 by 6 as indicated on drawings.

C. Roof Decking Configuration: For glued-laminated wood roof decking indicated to be of diaphragm design and construction, provide tongue-and-groove configuration that complies with research/evaluation report.

D. Face Grade:

1. Decorative: Sound knots and natural characteristics are allowed, including chipped edge knots, short end splits, seasoning checks, and some pin holes. Face knot holes, stains, end slits, skips, roller splits, and planer burns are not allowed.

E. Moisture Content: Provide wood roof decking with 15 percent maximum moisture content at time of dressing.

F. Face Surface: Smooth.

G. Edge Pattern: Channel grooved.

H. Laminating Adhesive: Wet-use type complying with ASTM D2559.

2.4 PRESERVATIVE TREATMENT

A. Pressure treat wood roof decking in accordance with AWPA U1; Use Category UC2.

1. For laminated roof decking, treat lumber before gluing.

B. Preservative Chemicals: [Inorganic boron (SBX)] [Acceptable to authorities having jurisdiction and containing no arsenic or chromium].

1. For exposed items indicated to receive a stained or natural finish, use products that do not contain colorants, bleed through, or otherwise adversely affect finishes.

C. Use process that includes water-repellent treatment.

2.5 ACCESSORY MATERIALS

A. Fasteners for Solid-Sawn Roof Decking: Provide fastener size and type complying with AITC 112 for thickness of deck used.

B. Fasteners for Glued-Laminated Roof Decking: Provide fastener size and type complying with requirements in "Installation" Article for installing laminated roof decking.

C. Nails: Common; complying with ASTM F1667, Type I, Style 10.

D. Spikes: Round; complying with ASTM F1667, Type III, Style 3.

E. Fastener Material: Hot-dip galvanized steel.

F. Bolts for Anchoring Roof Decking to Walls: Carbon steel; complying with ASTM A307 with ASTM A563 hex nuts and, where indicated, flat washers**,** all hot-dip zinc coated.

G. Installation Adhesive: For glued-laminated wood roof decking indicated to be of diaphragm design and construction, provide adhesive that complies with research/evaluation report.

H. Sealants: Latex, complying with applicable requirements in Section 07 92 00 "Joint Sealants" and recommended by sealant manufacturer and manufacturer of substrates for intended application.

I. Penetrating Sealer: Clear sanding sealer complying with Section 09 93 00 "Staining and Transparent Finishing" and compatible with topcoats specified for use over it.

2.6 FABRICATION

A. Shop Fabrication: Where preservative-treated roof decking is indicated, complete cutting, trimming, surfacing, and sanding before treating.

B. Predrill roof decking for lateral spiking to adjacent units to comply with AITC 112.

C. Seal Coat: After fabricating and surfacing roof decking, apply a saturation coat of penetrating sealer.

D. Apply indicated finish materials to comply with Section 09 93 00 "Staining and Transparent Finishing" in fabrication shop.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls and support framing in areas to receive wood roof decking for compliance with installation tolerances and other conditions affecting performance of wood roof decking.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install solid-sawn wood roof decking to comply with AITC 112.

1. Locate end joints for two-span continuous lay-up.

B. Install laminated wood roof decking to comply with manufacturer's written instructions.

1. Locate end joints for two-span continuous lay-up.
2. Nail each course of glued-laminated wood roof decking at each support with one nail slant nailed above the tongue and one nail straight nailed through the face.
    a. Use 12d nails for 2-by-6 and 2-by-8 roof decking.
    b. Use 30d nails for 3-by-6 and 3-by-8 roof decking.
    c. Use 60d nails for 4-by-6 and 4-by-8 roof decking. Predrill roof decking to prevent splitting.
    d. Use 30d tongue nails in bottom tongue and 3/8-inch face spikes for 5-by-6 and 5-by-8 roof decking. Predrill roof decking at spikes to prevent splitting.
3. Slant nail each course of glued-laminated wood roof decking to the tongue of the adjacent course at 30 inches o.c. and within 12 inches of the end of each unit. Stagger nailing 15 inches in adjacent courses.
    a. Use 6d nails for 2-by-6 and 2-by-8 roof decking.
    b. Use 8d nails for 3-by-6 and 3-by-8 roof decking.
    c. Use 10d nails for 4-by-6 and 4-by-8 roof decking.
    d. Use 16d nails for 5-by-6 and 5-by-8 roof decking.
4. Glue adjoining roof decking courses together by applying a 3/8-inch bead of adhesive to the top of tongues, according to research/evaluation report.

C. Anchor wood roof decking, where supported on walls, with bolts as indicated.

D. Where preservative-treated roof decking must be cut during erection, apply a field-treatment preservative to comply with AWPA M4.
1. For solid-sawn roof decking, use inorganic boron (SBX).
2. For laminated roof decking, use copper naphthenate.

E. Apply joint sealant to seal roof decking at exterior walls at the following locations:
1. Between roof decking and supports located at exterior walls.
2. Between roof decking and exterior walls that butt against underside of roof decking.
3. Between tongues and grooves of roof decking over exterior walls and supports at exterior walls.

3.3 ADJUSTING

A. Repair damaged surfaces and finishes after completing erection. Replace damaged roof decking if repairs are not approved by Architect.

3.4 PROTECTION

A. Provide water-resistive barrier over roof decking as the Work progresses to protect roof decking until roofing is applied.

B. If, despite protection, roof decking becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06 15 16

SECTION 06 16 00 - SHEATHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Wall sheathing.
2. Roof sheathing.
3. Underlayment.

B. Related Requirements:

1. Section 06 10 00 "Rough Carpentry"
2. Section 07 25 00 "Weather Barriers" for water-resistive barrier applied over wall sheathing.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Meeting: Conduct preinstallation meeting as part of general construction meeting or separately as necessary.

1. Review air-barrier and water-resistant glass-mat gypsum sheathing requirements and installation, special details, transitions, mockups, air-leakage testing, protection, and work scheduling that covers air-barrier and water-resistant glass-mat gypsum sheathing.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.
3. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5516.

4. For products receiving waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
5. For air-barrier and water-resistant glass-mat gypsum sheathing, include manufacturer's technical data and tested physical and performance properties of products.

B. Shop Drawings: For air-barrier and water-resistant glass-mat gypsum sheathing assemblies.

1. Show locations and extent of sheathing, accessories, and assemblies specific to Project conditions.
2. Include details for sheathing joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
3. Include details of interfaces with other materials that form part of air barrier.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer. including list of ABAA-certified installers and supervisors employed by Installer, who work on Project and testing and inspecting agency.

B. Product Certificates: From air-barrier and water-resistant glass-mat gypsum sheathing manufacturer, certifying compatibility of sheathing accessory materials with Project materials that connect to or that come in contact with the sheathing.

C. Product Test Reports: For each air-barrier and water-resistant glass-mat gypsum sheathing assembly, indicating compliance with specified requirements, for tests performed by a qualified testing agency.

D. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated plywood.
2. Fire-retardant-treated plywood.
3. Foam-plastic sheathing.
4. Air-barrier and water-resistant glass-mat gypsum sheathing.

E. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer of air-barrier and water-resistant glass-mat gypsum sheathing.

B. Testing Agency Qualifications:

1. For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

2. For testing and inspecting agency providing tests and inspections related to air-barrier and water-resistant glass-mat gypsum sheathing: an independent agency, qualified according to ASTM E 329 for testing indicated, and certified by Air Barrier Association of America, Inc.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance Ratings: As tested according to ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.
2. Air-Barrier Performance: Air-barrier and water-resistant glass-mat gypsum sheathing assembly, and seals with adjacent construction, shall be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing, tie-ins to other installed air barriers, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

2.2 WOOD PANEL PRODUCTS

A. Emissions: Products shall meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.

C. Factory mark panels to indicate compliance with applicable standard.

2.3 PRESERVATIVE-TREATED PLYWOOD

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.

2.4 FIRE-RETARDANT-TREATED PLYWOOD

A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Use treatment that does not promote corrosion of metal fasteners.
2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201/D 3201M at 92 percent relative humidity. Use where exterior type is not indicated.
4. Design Value Adjustment Factors: Treated lumber plywood shall be tested according to ASTM D 5516 and design value adjustment factors shall be calculated according to ASTM D 6305. Span ratings after treatment shall be not less than span ratings specified for roof sheathing and where high-temperature fire-retardant treatment is indicated, span ratings for temperatures up to 170 deg F shall be not less than span ratings specified.

C. Kiln-dry material after treatment to a maximum moisture content of 15 percent. Do not use material that is warped or does not comply with requirements for untreated material.

D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.

E. Application: Treat plywood indicated on Drawings, and the following:

1. Roof and wall sheathing within 48 inches of fire or party walls as indicated on the drawings.
2. Roof sheathing as indicated on the drawings.
3. Subflooring and underlayment for raised platforms as indicated on the drawings.

2.5 WALL SHEATHING

A. Plywood Sheathing: Exterior, Structural sheathing.

1. Span Rating: As indicated on drawings or, at minimum, not less than 32/16.
2. Nominal Thickness: As indicated on drawings or, at minimum, not less 1/2 inch.

B. Oriented-Strand-Board Sheathing:

1. Span Rating: As indicated on drawings or, at minimum, not less than 32/16.
2. Nominal Thickness: As indicated on drawings or, at minimum, not less 1/2 inch.

C. Paper-Surfaced Gypsum Sheathing: ASTM C 1396/C 1396M, gypsum sheathing; with water-resistant-treated core and with water-repellent paper bonded to core's face, back, and long edges.

1. Type and Thickness: As indicated on drawings or, at minimum, Type X, 5/8 inch thick.
2. Edge and End Configuration: V-shaped, tongue-and-groove long edges; square ends.
3. Size: As indicated on drawings or, at minimum, 48 by 96 inches for vertical and horizontal installation.

D. Glass-Mat Gypsum Sheathing: ASTM C 1177/1177M.

1. Type and Thickness: As indicated on drawings or, at minimum, Type X, 5/8 inch thick.
2. Size: As indicated on drawings or, at minimum, 48 by 96 inches for vertical installation.

E. Air-Barrier and Water-Resistant Glass-Mat Gypsum Sheathing: ASTM C 1177/1177M, Type X, coated fiberglass mat gypsum sheathing with integral weather-resistant barrier and air barrier complying with ASTM E 2178.

1. Thickness: 5/8 inch thick.
2. Size: As indicated on drawings or, at minimum, 48 by 96 inches for vertical installation.
3. Edges: Square.
4. Flashing and Transitions Strips: As acceptable to sheathing manufacturer.
5. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft pressure difference when tested according to ASTM E 2178.
6. Vapor Permeance: Minimum 20 perms when tested according to ASTM E 96/E 96M, Desiccant Method, Procedure A.
7. Fire Propagation Characteristics: Complies with NFPA 285 testing as part of an approved assembly.
8. UV Resistance: Can be exposed to sunlight for 90 days according to manufacturer's written instructions.
9. Provide primers, transition strips, termination strips, joint reinforcing fabric and strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by sheathing manufacturer to produce a complete air-barrier assembly and

that are compatible with primary air-barrier material and adjacent construction to which they may seal.

F. Cellulose Fiber-Reinforced Gypsum Sheathing: ASTM C 1278/C 1278M, gypsum sheathing.

1. Product: Subject to compliance with requirements, provide "Fiberock Sheathing with Aqua-Tough" by United States Gypsum Co.
2. Type and Thickness: As indicated on drawings or, at minimum, Type X, 5/8 inch thick.
3. Size: As indicated on drawings or, at minimum, 48 by 96 inches.

G. Cementitious Backer Units: ASTM C 1325, Type A.

1. Thickness: As indicated.

H. Fiberboard Sheathing: ASTM C 208, Type IV, Grade 1 (Regular) cellulosic fiberboard sheathing with square edges, Thickness as indicated on drawings or, at minimum, 1/2 inch.

2.6 ROOF SHEATHING

A. Plywood Sheathing: Either DOC PS 1 or DOC PS 2, sheathing.

1. Span Rating: As indicated on drawings or, at minimum, not less than 32/16.
2. Nominal Thickness: As indicated on drawings or, at minimum, not less than 15/32 inch.

B. Oriented-Strand-Board Sheathing: DOC PS 2, sheathing.

1. Span Rating: As indicated on drawings or, at minimum, not less than 32/16.
2. Nominal Thickness: As indicated on drawings or, at minimum, not less than 5/8 inch.

2.7 SUBFLOORING AND UNDERLAYMENT

A. Underlayment: Provide underlayment in nominal thicknesses indicated or, if not indicated, not less than 1/4 inch over smooth subfloors and not less than 3/8 inch over board or uneven subfloors.

1. Plywood Underlayment for Resilient Flooring: DOC PS 1, Exterior A-C with fully sanded face.
2. Plywood Underlayment for Carpet: DOC PS 1, Exterior, C-C Plugged.
3. Particleboard Underlayment: ANSI A208.1, Grade PBU or Grade M-2.
4. Hardboard Underlayment: ANSI A135.4, Class 4 (Service), Surface S1S; with back side sanded.

2.8 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, parapet, and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

D. Screws for Fastening Sheathing to Wood Framing: ASTM C 1002.

E. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

F. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached.

1. For steel framing less than 0.0329 inch thick, use screws that comply with ASTM C 1002.
2. For steel framing from 0.033 to 0.112 inch thick, use screws that comply with ASTM C 954.

2.9 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

A. Sealant for Glass-Mat Gypsum Sheathing: Elastomeric, medium-modulus, neutral-curing silicone joint sealant compatible with joint substrates formed by gypsum sheathing and other materials, recommended by sheathing manufacturer for application indicated and complying with requirements for elastomeric sealants specified in Section 07 92 00 "Joint Sealants."

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following:

1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.

D. 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. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.

B. Fastening Methods: Fasten panels as indicated below:

1. Combination Subfloor-Underlayment:

   a. Glue and nail to wood framing.
   b. Screw to cold-formed metal framing.
   c. Space panels 1/8 inch apart at edges and ends.

2. Subflooring:

   a. Glue and nail wood framing to wood framing.
   b. Screw to cold-formed metal framing.
   c. Space panels 1/8 inch apart at edges and ends.

3. Wall and Roof Sheathing:

   a. Nail to wood framing
   b. Screw to cold-formed metal framing.
   c. Space panels 1/8 inch apart at edges and ends.

4. Underlayment:

   a. Nail to subflooring.
   b. Space panels 1/32 inch apart at edges and ends.
   c. Fill and sand edge joints of underlayment receiving resilient flooring immediately before installing flooring.

3.3 GYPSUM SHEATHING INSTALLATION

A. Comply with GA-253 and with manufacturer's written instructions.

1. Fasten gypsum sheathing to wood framing with screws.
2. Fasten gypsum sheathing to cold-formed metal framing with screws.
3. Install panels with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
4. Install panels with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.

C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent panels without forcing. Abut ends over centers of studs, and stagger end joints of adjacent panels not less than one stud spacing. Attach at perimeter and within field of panel to each stud.

1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of panels.
2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.

D. Vertical Installation: Install vertical edges centered over studs. Abut ends and edges with those of adjacent panels. Attach at perimeter and within field of panel to each stud.

1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of panels.
2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.

E. Seal sheathing joints according to sheathing manufacturer's written instructions.

1. Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient amount of sealant to completely cover joints and fasteners after troweling. Seal other penetrations and openings.
2. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

F. Air-Barrier and Water-Resistant Glass-Mat Gypsum Sheathing:

1. Install accessory materials according to sheathing manufacturer's written instructions and details to form a seal with adjacent construction, to seal fasteners, and ensure continuity of air and water barrier.

    a. Coordinate the installation of sheathing with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
    b. Install transition strip on roofing membrane or base flashing, so that a minimum of 3 inches of coverage is achieved over each substrate.

2. Connect and seal sheathing material continuously to air barriers specified under other Sections as well as to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
3. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

4. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip, so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of full contact over firm bearing to perimeter frames, with not less than 1 inch of full contact.

    a. Transition Strip: Roll firmly to enhance adhesion.
    b. Preformed Silicone Extrusion: Set in full bed of silicone sealant applied to walls, frame, and air-barrier material.

5. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, doors, and miscellaneous penetrations of sheathing material with foam sealant.
6. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.
7. Seal top of through-wall flashings to sheathing with an additional 6-inch-wide, transition strip.
8. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
9. Repair punctures, voids, and deficient lapped seams in strips and transition strips extending 6 inches beyond repaired areas in strip direction.

3.4 CEMENTITIOUS BACKER UNIT INSTALLATION

A. Install panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated.

3.5 FIBERBOARD SHEATHING INSTALLATION

A. Comply with ASTM C 846 and with manufacturer's written instructions.

B. Fasten fiberboard sheathing panels to intermediate supports and then at edges and ends. Use galvanized roofing nails; comply with manufacturer's recommended spacing and referenced fastening schedule. Drive fasteners flush with surface of sheathing and locate perimeter fasteners at least 3/8 inch from edges and ends.

C. Install sheathing vertically with long edges parallel to, and centered over, studs. Install solid wood blocking where end joints do not occur over framing. Allow 1/8-inch open space between edges and ends of adjacent units. Stagger horizontal joints if any.

D. Cover sheathing as soon as practical after installation to prevent deterioration from wetting.

3.6 PARTICLEBOARD UNDERLAYMENT INSTALLATION

A. Comply with CPA's recommendations for type of subfloor indicated. Fill and sand gouges, gaps, and chipped edges. Sand uneven joints flush.

1. Fastening Method: Nail or staple underlayment to subflooring.

3.7 HARDBOARD UNDERLAYMENT INSTALLATION

A. Comply with CPA's recommendations and hardboard manufacturer's written instructions for preparing and applying hardboard underlayment.

1. Fastening Method: Nail or staple underlayment to subflooring.

3.8 FIELD QUALITY CONTROL

A. ABAA Quality Assurance Program: Perform examinations, preparation, installation, testing, and inspections under ABAA's Quality Assurance Program.

B. Testing and Inspecting Agency: Owner will engage a qualified testing agency to perform tests and inspections.

C. Inspections: Air-barrier and water-resistant glass-mat gypsum sheathing, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:

1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.
2. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
3. Termination mastic has been applied on cut edges.
4. Strips and transition strips have been firmly adhered to substrate.
5. Compatible materials have been used.
6. Transitions at changes in direction and structural support at gaps have been provided.
7. Connections between assemblies (sheathing and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
8. All penetrations have been sealed.

D. Tests: As determined by testing agency from among the following tests:

1. Air-Leakage-Location Testing: Air-barrier sheathing assemblies will be tested for evidence of air leakage according to jurisdiction having authority.
2. Air-Leakage-Volume Testing: Air-barrier assemblies will be tested for air-leakage rate according to ASTM E 783 or ASTM E 2357.

E. Air barriers will be considered defective if they do not pass tests and inspections.

F. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.

G. Prepare test and inspection reports.

END OF SECTION 06 16 00

SECTION 06 17 53 - SHOP-FABRICATED WOOD TRUSSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Wood roof trusses.

1.3 INFORMATIONAL SUBMITTALS

A. Material Certificates: For dimension lumber specified to comply with minimum specific gravity. Indicate species and grade selected for each use and specific gravity.

1.4 REFERENCES

A. American Iron and Steel Institute (AISI):
   1. AISI, Fasteners.

B. American Institute of Timber Construction (AITC):
   1. AITC, Glue Laminated Wood Beam Construction.

C. American National Standards Institute (ANSI):
   1. ANSI A 199.1, Plywood Standards
   2. ANSI B 18.2.1, Lag Bolts.
   3. ANSI B 18.6.1, Wood Screws.

D. American Plywood Association (APA):
   1. APA, Plywood Grading.
   2. APA Form No. E-30D Design / Construction Guide.

E. American Society for Testing and Materials (ASTM):
   1. ASTM A-307-97, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength {Strength: Steel Bolts}.
   2. ASTM A-563-97, Standard Specification for Carbon and Alloy Steel Nuts {Hex Nuts}.
   3. ASTM D-1413-99, Standard Test Method for Wood Preservatives by Laboratory Soil-Block Cultures {Moisture-Resistance Testing; Lumber}.
   4. ASTM D-3201-94(2003), Standard Test Method for Hygroscopic Properties of Fire-Retardant Wood and Wood-Base Products.
   5. ASTM D-3345-74(1999), Standard Test Method for Laboratory Evaluation of Wood and Other Cellulosic Materials for Resistance to Termites.
   6. ASTM D-5516-03, Standard Test Method for Evaluating the Flexural Properties of Fire-Retardant Treated Softwood Plywood Exposed to Elevated Temperatures.
   7. ASTM D-5664-02, Standard Test Method for Evaluating the Effects of Fire-Retardant Treatments and Elevated Temperatures on Strength Properties of Fire-Retardant Treated Lumber.

8. ASTM E-84-99, Standard Test Method for Surface Burning Characteristics of Building Materials {Surface Burning; Lumber and Pegboard}.
9. ASTM E-136-99, Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750□C {Fire-Retardant Treated Lumber}.

F. American Wood Products Board (AWPB) and American Wood Preservers Association (AWPA):
1. AWPA C2, Pressure-Treated Lumber.
2. AWPA C9, Pressure-Treated Plywood.
3. AWPA C20, Fire-Retardant Treated Lumber {F.R.T. Structural Lumber}
4. AWPA C27, Fire-Retardant Treated Plywood.
5. AWPA C31, Fire-Retardant Treated Appendix H-Above Ground {F.R.T. Lumber Not in Contact with Ground}.
6. AWPA P5, Fire-Retardant Treated-SBX Boron Treated {Waterborne Preservatives}.
7. AWPA P17, Fire-Retardant Treated-Formulation FR-1 {Fire-Retardant Formulations}.
8. AWPA UC1 and UC2, Fire-Retardant Treated Using Category System.
9. AWPB, Fire-Retardant Treated Lumber 10. AWPB, Pressure-Treated Plywood.
10. AWPB LP-2, Water Borne Preservatives.

G. Federal Specifications (FS):
1. FS FF-N-105, Federal Specifications for Nails, Wire Brads and Staples.

H. National Evaluation Service, Inc. (NES) - National Evaluation Report (NER):
1. NER-303, National Evaluation Report, Evaluation of Fire-Retardant Treated Wood.

I. National Fire Protection Association (NFPA):
1. NFPA 255, Method of Test for Surface Burning Characteristics of Building Materials.

J. National Forrest Products Association (NFPA):
1. NFPA, Structural Values for Wood Beams, Joists and Headers.

K. Occupational, Safety and Health Administration (OSHA):

L. Southern Pine Inspection Bureau (SPIB):
1. SPIB, Construction Grade Lumber.

M. Underwriters Laboratories Inc. (UL):
1. U.L., Building Materials Directory.
2. U.L., Recognized Wood Components.
3. U.L. 723, Standard Test Method for Surface Burning Characteristics of Building Materials.

N. West Coast Lumber Inspection Bureau (WCLIB):
1. WCLIB, Construction Grade Lumber.

PART 2 - PRODUCTS

2.1 MANUFACTURER:

A. Basis of Design: RedBuilt, LLC
   1. East Division: 614-270-6919
   2. Central Division: 740-368-4228
   3. West Division: 310-995-4050

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design metal-plate-connected wood trusses.
B. Structural Performance: Metal-plate-connected wood trusses shall be capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1 unless more stringent requirements are specified below.
   1. Maximum Deflection under Design Loads:
      a. Roof Trusses: Vertical deflection of 1/240 of span.
C. Comply with applicable requirements and recommendations of TPI 1, TPI DSB, and SBCA BCSI.

2.3 DIMENSION LUMBER

A. Lumber: DOC PS 20 and applicable rules of any rules-writing agency certified by the American Lumber Standard Committee (ALSC) Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

   1. Factory mark each piece of lumber with grade stamp of grading agency.
   2. For exposed lumber indicated to receive a stained or natural finish, omit grade stamp and provide certificates of grade compliance issued by grading agency.
   3. Provide dressed lumber, S4S.
   4. Provide dry lumber with 15 percent maximum moisture content at time of dressing.
B. Minimum Chord Size for Roof Trusses: 2 by 6 inches nominal for both top and bottom chords.

2.4 FIRE-RETARDANT-TREATED WOOD

A. Fire-Retardant-Treated Lumber by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
   1. Use treatment that does not promote corrosion of metal fasteners.
   2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use for interior locations where exterior type is not indicated.
B. Kiln-dry lumber after treatment to a maximum moisture content of 15 percent.
C. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.
   1. For exposed trusses and bracing indicated to receive a stained or natural finish, mark end or back of each piece.

D. For exposed trusses indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.

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. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.
2. Where trusses are exposed to weather, in ground contact, made from pressure-preservative treated wood, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

2.6 METAL FRAMING ANCHORS AND ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
1. Cleveland Steel Specialty Co.
2. KC Metals Products, Inc.
3. Simpson Strong-Tie Co., Inc.
4. USP Structural Connectors.

C. Allowable design loads, as published by manufacturer, shall comply with or exceed those of products of manufacturers listed. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.

D. Truss Tie-Downs: Bent strap tie for fastening roof trusses to wall studs below, 1-1/2 inches wide by 0.050 inch thick. Tie fastens to one side of truss, top plates, and side of stud below.

E. Roof Truss Clips: Angle clips for bracing bottom chord of roof trusses at non-load-bearing walls, 1-1/4 inches wide by 0.050 inch thick. Clip is fastened to truss through slotted holes to allow for truss deflection.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install wood trusses only after supporting construction is in place and is braced and secured.

B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.

C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.

D. Install and brace trusses according to TPI recommendations and as indicated.
E. Install trusses plumb, square, and true to line and securely fasten to supporting construction.
F. Space trusses as indicated; adjust and align trusses in location before permanently fastening.
G. Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.
H. Install wood trusses within installation tolerances in TPI 1.
I. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.
J. Replace wood trusses that are damaged or do not comply with requirements.

1. Damaged trusses may be repaired according to truss repair details signed and sealed by the qualified professional engineer responsible for truss design, when approved by Architect.

3.2 REPAIRS AND PROTECTION

A. Protect wood trusses from weather. If, despite protection, wood trusses become wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06 17 53

SECTION 06 18 00 - GLUED-LAMINATED CONSTRUCTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes framing using structural glued-laminated timber.

B. Related Requirements:

1. Section 06 10 00 "Rough Carpentry" for dimension lumber items associated with structural glued-laminated timber.

1.3 DEFINITIONS

A. Structural Glued-Laminated (Glulam) Timber: An engineered, stress-rated timber product assembled from selected and prepared wood laminations bonded together with adhesives and with the grain of the laminations approximately parallel longitudinally.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include data on lumber, adhesives, fabrication, and protection.
2. For preservative-treated wood products. Include chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.
3. For connectors. Include installation instructions.

B. Shop Drawings:

1. Show layout of structural glued-laminated timber system and full dimensions of each member.
2. Indicate species and laminating combination.
3. Include large-scale details of connections.

C. Samples: Full width and depth, 24 inches long, showing the range of variation to be expected in appearance of structural glued-laminated timber including variations due to specified treatment.

1. Apply specified factory finish to three sides of half-length of each Sample.

D. Delegated-Design Submittal: For structural glued-laminated timber and timber connectors.

1.5 INFORMATIONAL SUBMITTALS

A. Certificates of Conformance: Issued by a qualified testing and inspecting agency indicating that structural glued-laminated timber complies with requirements in AITC A190.1.

B. Material Certificates: For preservative-treated wood products, from manufacturer. Indicate type of preservative used and net amount of preservative retained.

C. Research/Evaluation Reports: For structural glued-laminated timber and timber connectors, from ICC-ES.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: An AITC- or APA-EWS-licensed firm.

1.7 DELIVERY, STORAGE, AND HANDLING

A. General: Comply with provisions in AITC 111.

B. Individually wrap members using plastic-coated paper covering with water-resistant seams.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Division 01 Section "Quality Requirements," to design structural glued-laminated timber and connectors.

B. Structural Performance: Structural glued-laminated timber and connectors shall withstand the effects of structural loads shown on Drawings without exceeding allowable design working stresses listed in AITC 117 or determined according to ASTM D 3737 and acceptable to authorities having jurisdiction.

C. Seismic Performance: Structural glued-laminated timber and connectors shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

2.2 STRUCTURAL GLUED-LAMINATED TIMBER

A. General: Provide structural glued-laminated timber that complies with AITC A190.1 and AITC 117 or research/evaluation reports acceptable to authorities having jurisdiction.

1. Factory mark each piece of structural glued-laminated timber with AITC Quality Mark or APA-EWS trademark. Place mark on surfaces that are not exposed in the completed Work.
2. Provide structural glued-laminated timber made from single species.
3. Provide structural glued-laminated timber made from solid lumber laminations; do not use laminated veneer lumber.
4. Provide structural glued-laminated timber made with wet-use adhesive complying with AITC A190.1.

B. Species and Grades for Structural Glued-Laminated Timber: Alaska cedar, Douglas fir-larch, Southern pine in grades needed to comply with "Performance Requirements" Article.

C. Species and Grades for Structural Glued-Laminated Timber: Alaska cedar, Douglas fir-larch, Southern pine that complies with structural properties as indicated.

D. Species and Grades for Beams and Purlins:

1. Species and Beam Stress Classification: Ponderosa pine, 16F-1.3E, Alaska cedar, 20F-1.5E, Eastern spruce, 20F-1.5E, Douglas fir-larch, 24F-1.8E, or Southern pine.
2. Lay-up: Either balanced or unbalanced.
3. Species and Combination Symbol: Per structural.

E. Species and Grades for Arches:

1. Species and Beam Stress Classification: Alaska cedar, 20F-1.5E, Eastern spruce, 20F-1.5E, Douglas fir-larch, 24F-1.8E or Southern pine, 24F-1.8E.
2. Lay-up: Either balanced or unbalanced.
3. Species and Combination Symbol: Alaska cedar, 20F-V13 WS, Douglas fir-larch, 24F-V8 WS, Southern pine, 24F-V5 SP, Alaska cedar, 20F-V12 WS, Douglas fir-larch, 24F-V4 WS.

F. Species and Grades for Columns and Truss Members:

1. Species and Combination Symbol: Alaska cedar, 70, Douglas fir-larch, 1, Southern pine, 47, or Southern pine, 50.

G. Appearance Grade: As indicated on drawings or at a minimum, Architectural, complying with AITC 110.

1. For Premium and Architectural appearance grades, fill voids as required by AITC 110. For Premium appearance grade, use clear wood inserts, of matching grain and color, for filling voids and knot holes more than 1/4 inch wide.

2.3 PRESERVATIVE TREATMENT

A. Preservative Treatment: Where preservative-treated structural glued-laminated timber is indicated, comply with AWPA U1, Use As indicated on drawings or at a minimum, Category 2.

1. Use preservative solution without water repellents or substances that might interfere with application of indicated finishes.
2. Do not incise structural glued-laminated timber or wood used to produce structural glued-laminated timber.

B. Preservative:

1. Oxine copper (copper-8-quinolinolate) in a light petroleum solvent.
2. Pentachlorophenol in light petroleum solvent.
3. Copper naphthenate in a light petroleum solvent.
4. Ammoniacal zinc copper arsenate (ACZA) in a water solution.
5. Chromated copper arsenate (CCA) in a water solution.
6. Ammoniacal copper quat Type A (ACQ-C) in a water solution.
7. Propiconazole tebuconazole imidacloprid (PTI) in a water emulsion.

C. After dressing members, apply a copper naphthenate field-treatment preservative to comply with AWPA M4 to surfaces cut to a depth of more than 1/16 inch.

2.4 TIMBER CONNECTORS

A. Fabricate beam seats as indicated on drawings or, at a minimum, from steel with 0.239-inch bearing plates, 3/4-inch-diameter-by-12-inch-long deformed bar anchors, and 0.239-inch side plates.

B. Fabricate arch base shoes as indicated on drawings or, at a minimum, from steel with 1-inch baseplates and 3/8-inch side plates.

C. Fabricate beam hangers as indicated on drawings or, at a minimum, from steel with 0.179-inch stirrups and 0.239-inch top plates.

D. Fabricate hinge connectors as indicated on drawings or, at a minimum, from steel with 0.179-inch side plates and 3/4-inch top and bottom plates.

E. Fabricate strap ties as indicated on drawings or, at a minimum, from steel, 2-1/2 inches wide by 0.179 inch thick.

F. Fabricate tie rods from round steel bars with upset threads connected with forged-steel turnbuckles complying with ASTM A 668/A 668M.

G. Provide bolts, 3/4 inch unless otherwise indicated, complying with ASTM A 307, Grade A; nuts complying with ASTM A 563; and, where indicated, flat washers.

H. Provide shear plates, as indicated on drawings or, at a minimum, 4 inches in diameter, complying with ASTM D 5933.

I. Materials: Unless otherwise indicated, fabricate from the following materials:

1. Structural-steel shapes, plates, and flat bars complying with ASTM A 36/A 36M.
2. Round steel bars complying with ASTM A 575, Grade M 1020.
3. Hot-rolled steel sheet complying with ASTM A 1011/A 1011M, Structural Steel, Type SS, Grade 33.
4. Stainless-steel plate and flat bars complying with ASTM A 666.
5. Stainless-steel bars and shapes complying with ASTM A 276.
6. Stainless-steel sheet complying with ASTM A 240/A 240M or ASTM A 666.

J. Finish steel assemblies and fasteners with rust-inhibitive primer, 2-mil dry film thickness.

K. Hot-dip galvanize steel assemblies and fasteners after fabrication to comply with ASTM A 123/A 123M or ASTM A 153/A 153M.

2.5 MISCELLANEOUS MATERIALS

A. End Sealer: Manufacturer's standard, transparent, colorless wood sealer that is effective in retarding the transmission of moisture at cross-grain cuts and is compatible with indicated finish.

B. Penetrating Sealer: Manufacturer's standard, transparent, penetrating wood sealer that is compatible with indicated finish.

2.6 FABRICATION

A. Shop fabricate for connections to greatest extent possible, including cutting to length and drilling bolt holes.

1. Dress exposed surfaces as needed to remove planing and surfacing marks.

B. Camber: Fabricate horizontal and inclined members of less than 1:1 slope with either circular or parabolic camber equal to 1/500 of span.

C. Where preservative-treated members are indicated, fabricate (cut, drill, surface, and sand) before treatment to greatest extent possible. Where fabrication must be done after treatment, apply a field-treatment preservative to comply with AWPA M4.

1. Use inorganic boron (SBX) treatment for members not in contact with the ground and continuously protected from liquid water.
2. Use copper naphthenate treatment for members in contact with the ground or not continuously protected from liquid water.

D. End-Cut Sealing: Immediately after end cutting each member to final length and after preservative treatment if required, apply a saturation coat of end sealer to ends and other cross-cut surfaces, keeping surfaces flood coated for not less than 10 minutes.

E. Seal Coat: After fabricating, sanding, and end-coat sealing, apply a heavy saturation coat of penetrating sealer on surfaces of each unit except for preservative-treated wood where treatment included a water repellent.

2.7 FACTORY FINISHING

A. Wiped Stain Finish: Manufacturer's standard, dry-appearance, penetrating acrylic stain and sealer; oven dried and resistant to mildew and fungus.

1. Color: As selected by Architect from manufacturer's full range.

B. Clear Finish: Manufacturer's standard, two-coat, clear varnish finish; resistant to mildew and fungus.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates in areas to receive structural glued-laminated timber, with Installer present, for compliance with requirements, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Erect structural glued-laminated timber true and plumb and with uniform, close-fitting joints. Provide temporary bracing to maintain lines and levels until permanent supporting members are in place.

1. Handle and temporarily support glued-laminated timber to prevent surface damage, compression, and other effects that might interfere with indicated finish.

B. Framing Built into Masonry: Provide 1/2-inch clearance at tops, sides, and ends of members built into masonry; bevel cut ends 3 inches; and do not embed more than 4 inches unless otherwise indicated.

C. Cutting: Avoid extra cutting after fabrication. Where field fitting is unavoidable, comply with requirements for shop fabrication.

D. Fit structural glued-laminated timber by cutting and restoring exposed surfaces to match specified surfacing and finishing.

1. Predrill for fasteners using timber connectors as templates.
2. Finish exposed surfaces to remove planing or surfacing marks and to provide a finish equivalent to that produced by machine sanding with No. 120 grit sandpaper.
3. Coat cross cuts with end sealer.
4. Where preservative-treated members must be cut during erection, apply a field-treatment preservative to comply with AWPA M4.

    a. Use inorganic boron (SBX) treatment for members not in contact with the ground and continuously protected from liquid water.
    b. Use copper naphthenate treatment for members in contact with the ground or not continuously protected from liquid water.

E. Install timber connectors as indicated.

1. Unless otherwise indicated, install bolts with same orientation within each connection and in similar connections.
2. Install bolts with orientation as indicated or, if not indicated, as directed by Architect.

3.3 ADJUSTING

A. Repair damaged surfaces and finishes after completing erection. Replace damaged structural glued-laminated timber if repairs are not approved by Architect.

3.4 PROTECTION

A. Do not remove wrappings on individually wrapped members until they no longer serve a useful purpose, including protection from weather, sunlight, soiling, and damage from work of other trades.

1. Coordinate wrapping removal with finishing work. Retain wrapping where it can serve as a painting shield.
2. Slit underside of wrapping to prevent accumulation of moisture inside the wrapping.

END OF SECTION 06 18 00

SECTION 06 20 13 - EXTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Exterior wood, medium-density overlay (MDO), and/or foam-plastic trim.

B. Related Requirements:

1. Section 06 10 00 "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view and for framing exposed to view.

1.3 DEFINITIONS

A. MDO: Plywood with a medium-density overlay on the face.

B. PVC: Polyvinyl chloride.

1.4 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. Include data for wood-preservative treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained. Include chemical-treatment manufacturer's written instructions for finishing treated material.
2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced before shipment to Project site to levels specified.

B. Samples: For each exposed product and for each color and texture specified.

C. Samples for Initial Selection: For each type of product involving selection of colors, profiles, or textures.

D. Samples for Verification:

1. For each species and cut of lumber and panel products, with half of exposed surface finished; 50 sq. in. for lumber and 8 by 10 inches for panels.
2. For cellular PVC trim, with half of exposed surface finished; 50 sq. in..
3. For foam-plastic moldings, with half of exposed surface finished; 50 sq. in..

1.5 INFORMATIONAL SUBMITTALS

A. Compliance Certificates:

1. For lumber that is not marked with grade stamp.
2. For preservative-treated wood that is not marked with treatment-quality mark.

B. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated wood.
2. Cellular PVC trim.
3. Foam-plastic moldings.

C. Sample Warranties: For manufacturer's warranties.

1.6 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.

1.7 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.

1.8 WARRANTY

A. Manufacturer's Warranty for Hardboard Siding, Soffits and/or Trim: Manufacturer agrees to repair or replace components that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, deformation or deterioration beyond normal weathering.
2. Warranty Period for Factory-Applied Finish: Five years from date of Substantial Completion.
3. Warranty Period for Siding, Soffits and Trim (Excluding Finish): 20 years from date of Substantial Completion.

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 inspection agency, indicating grade, species, moisture content at time of surfacing, and mill.
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 inspection agency.

B. Softwood Plywood: DOC PS 1.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Water-Repellent Preservative Treatment by Nonpressure Process: AWPA N1; dip, spray, flood, or vacuum-pressure treatment.

1. Preservative Chemicals: 3-iodo-2-propynyl butyl carbamate (IPBC), combined with an insecticide containing chloropyrifos (CPF).
2. Use chemical formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants in solution to distinguish treated material from untreated material.
3. Application: Items not required to be pressure-preservative treated, Exterior trim and wood siding.

B. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC3a or UC3b.

1. Kiln dry lumber and plywood after treatment to a maximum moisture content of 19 and 18 percent, respectively.
2. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
3. For exposed items indicated to receive transparent finish, do not use chemical formulations that contain colorants or that bleed through or otherwise adversely affect finishes.
4. Do not use material that is warped or does not comply with requirements for untreated material.

5. Mark lumber with treatment-quality mark of an inspection agency approved by the ALSC's Board of Review.

    a. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.

6. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.

    a. For exposed plywood indicated to receive a stained or natural finish, mark back of each piece.

7. Application: All exterior lumber and plywood.

2.3 EXTERIOR TRIM

A. Lumber Trim for Semitransparent-Stained Finish or Clear Finish:

1. Species and Grade: Redwood; RIS Clear unless otherwise noted on drawings.
2. Species and Grade: Western red cedar; NLGA, WCLIB, or WWPA Grade A unless otherwise noted on drawings.
3. Species and Grade: Hem-fir; pressure-preservative treated; NLGA, WCLIB, or WWPA 1 Common unless otherwise noted on drawings.
4. Species and Grade: Southern pine; pressure-preservative treated; SPIB B & B unless otherwise noted on drawings.
5. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.
6. Face Surface: Surfaced unless otherwise noted on drawings.

B. Lumber Trim for Opaque-Stained or Painted Finish:

1. Species and Grade: Redwood; RIS Grade B unless otherwise noted on drawings.
2. Species and Grade: Western red cedar; NLGA, WCLIB, or WWPA Grade B unless otherwise noted on drawings.
3. Species and Grade: Hem-fir; NLGA, WCLIB, or WWPA Prime or D finish unless otherwise noted on drawings.
4. Species and Grade: Eastern white pine, eastern hemlock-balsam fir-tamarack, eastern spruce, or white woods; NeLMA, NLGA, WCLIB, or WWPA Finish or 1 Common (Colonial) unless otherwise noted on drawings..
5. Species and Grade: Northern white cedar; NeLMA or NLGA 1 Common unless otherwise noted on drawings.
6. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.
7. Face Surface: Surfaced (smooth) unless otherwise noted on drawings.
8. Factory Priming: Factory coated on both faces and all edges, with exterior primer compatible with topcoats specified.

C. Moldings for Semitransparent-Stained Finish or Clear Finish: MMPA WM 4, N-grade wood moldings, without finger jointing, made from kiln-dried stock to patterns included in MMPA's "WM/Series Softwood Moulding Patterns."

1. Species: Redwood, Western red cedar, Eastern white, Idaho white or Lodgepole, ponderosa.

D. Moldings for Opaque-Stained or Painted Finish: MMPA WM 4, P-grade wood moldings, made from kiln-dried stock to patterns included in MMPA's "WM/Series Softwood Moulding Patterns."

1. Species: Redwood, Western red cedar, Eastern white, Idaho white or Lodgepole, ponderosa.
2. Factory Priming: Factory coated on both faces and all edges, with exterior primer compatible with topcoats specified.

E. MDO Trim: Exterior Grade B-B MDO plywood.

F. Primed Hardboard Trim: ANSI A135.6, primed with manufacturer's standard exterior primer. Recommended by manufacturer for exterior use.

2.4 PLYWOOD SIDING

A. Plywood Type: APA-rated siding in panel sizes indicated.

B. Thickness: As indicated on drawings or, at minimum, 15/32 inch.

C. Face Species: Douglas fir, Western red cedar or Redwood.

D. Pattern: As indicated on drawings.

E. Surface: As indicated on drawings.

2.5 MISCELLANEOUS MATERIALS

A. Fasteners for Exterior Finish Carpentry: Provide nails or screws, in sufficient length to penetrate not less than 1-1/2 inches into wood substrate.

1. For face-fastening siding, provide ringed-shank siding nails or hot-dip galvanized-steel siding nails unless otherwise indicated.
2. For redwood, provide min. hot-dip galvanized-steel fasteners.
3. For prefinished items, provide matching prefinished aluminum fasteners where face fastening is required.
4. For pressure-preservative-treated wood, provide stainless steel or hot-dip galvanized-steel fasteners.
5. For applications not otherwise indicated, provide stainless steel or hot-dip galvanized-steel fasteners.

B. Wood Glue: Waterproof resorcinol glue recommended by manufacturer for exterior carpentry use.

C. Adhesive for Cellular PVC Trim: Product recommended by trim manufacturer.

D. Flashing: Comply with requirements in Section 07 62 00 "Sheet Metal Flashing and Trim" for flashing materials installed in exterior finish carpentry.

1. Horizontal Joint Flashing for Panel Siding: Preformed, galvanized-steel, aluminum, prefinished-aluminum or stainless steel, Z-shaped flashing as indicated on drawings.

E. Insect Screening for Soffit Vents: Min. PVC-coated glass-fiber black fabric, 18-by-14-inch or 18-by-16-inch mesh.

F. Continuous Soffit Vents: Aluminum hat channel shape with perforations, 2 inches wide and in lengths not less than 96 inches.

1. Net-Free Area: As indicated on drawings or, at minimum, 8 sq. in./linear ft..
2. Finish: As indicated on drawings or, at minimum, Mill finish.

G. Sealants: Latex, complying with ASTM C 834 and applicable requirements in Section 07 92 00 "Joint Sealants," and recommended by sealant and substrate manufacturers for intended application.

2.6 FABRICATION

A. Back out or kerf backs of standing and running trim wider than 5 inches, except members with ends exposed in finished work.

B. 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. Prime lumber and moldings to be painted, including both faces and edges, unless factory primed.

1. Cut to required lengths and prime ends.
2. Comply with requirements in Section 09 91 13 "Exterior Painting."

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 STANDING AND RUNNING TRIM INSTALLATION

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 SIDING INSTALLATION

A. Install siding to comply with manufacturer's written instructions and warranty requirements.

B. Plywood Siding:

1. Install panels with edges over framing or blocking.
2. Nail at 6 inches o.c. at panel perimeter and 12 inches o.c. at intermediate supports unless manufacturer recommends closer spacing.

3. Leave 1/16-inch gap between adjacent panels and 1/8-inch gap at perimeter, openings, and horizontal joints unless otherwise recommended by panel manufacturer.
4. Seal butt joints at inside and outside corners and at trim locations.
5. Install continuous metal flashing at horizontal panel joints.
6. Apply battens and corner trim as indicated.
7. Conceal fasteners to greatest practical extent by placing in grooves of siding pattern or by concealing with applied trim or battens as detailed.

    a. Do not nail through overlapping pieces.

C. Flashing: Install metal flashing as indicated on Drawings and as recommended by siding manufacturer.

D. Finish: Apply finish within two weeks of installation.

3.6 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.

3.7 CLEANING

A. Clean exterior finish carpentry on exposed and semiexposed surfaces.

B. Touch up factory-applied finishes to restore damaged or soiled areas.

3.8 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 06 20 13

SECTION 06 20 23 - INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Interior trim, including non-fire-rated interior door and sidelight frames.
2. Interior plywood, hardboard and board paneling.
3. Shelving and clothes rods.

B. Related Requirements:

1. Section 06 10 00 "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view and for framing exposed to view.
2. Section 09 91 23 "Interior Painting" for priming and back priming of interior finish carpentry.

1.3 DEFINITIONS

A. MDF: Medium-density fiberboard.

B. MDO: Plywood with a medium-density overlay on the face.

C. PVC: Polyvinyl chloride.

D. Lumber grading agencies and the abbreviations used to reference them include the following:

1. WCLIB; West Coast Lumber Inspection Bureau.

1.4 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. Include data for wood-preservative treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained. Include chemical-treatment manufacturer's written instructions for finishing treated material.
2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced before shipment to Project site to levels specified.

B. Samples: For each exposed product and for each color and texture specified.

C. Samples for Initial Selection: For each type of product involving selection of colors, profiles, or textures.

D. Samples for Verification:
   1. For each species and cut of lumber and panel products with nonfactory-applied finish, with half of exposed surface finished; 50 sq. in. for lumber and 8 by 10 inches for panels.
   2. For foam-plastic moldings, with half of exposed surface finished; 50 sq. in..
   3. For each finish system and color of lumber and panel products with factory-applied finish, 50 sq. in. for lumber and 8 by 10 inches for panels.

1.5 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.

1.6 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.
   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.

B. Softwood Plywood: DOC PS 1.

C. Hardboard: ANSI A135.4.

D. MDF: ANSI A208.2.

E. Particleboard: ANSI A208.1.

F. Melamine-Faced Particleboard: Particleboard complying with ANSI A208.1, Grade M-2, finished on both faces with thermally fused, melamine-impregnated decorative paper and complying with NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.

1. Color: As selected by Architect from manufacturer's full range.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC1.

1. Kiln dry lumber and plywood after treatment to a maximum moisture content of 19 and 18 percent, respectively.

2. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

3. For exposed items indicated to receive transparent finish, do not use chemical formulations that contain colorants or that bleed through or otherwise adversely affect finishes.

4. Do not use material that is warped or does not comply with requirements for untreated material.

5. Mark lumber with treatment-quality mark of an inspection agency approved by the ALSC's Board of Review.

a. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.

6. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.

a. For exposed plywood indicated to receive a stained or natural finish, mark back of each piece.

7. Application: Where indicated on Drawings.

2.3 INTERIOR TRIM

A. Softwood Lumber Trim for Transparent Finish (Stain or Clear Finish):

1. Species and Grade:

a. Eastern white pine; NeLMA or NLGA as indicated on the drawings or at minimum, Finish or 1 Common.

b. Idaho white, lodgepole, ponderosa, radiata, or sugar pine; NLGA or WWPA as indicated on the drawings or at minimum, D Select.

c. Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine; NeLMA, NLGA, or WWPA as indicated on the drawings or at minimum, D Select (Quality).
d. White woods; WWPA as indicated on the drawings or at minimum, D Select.
e. Douglas fir-larch or Douglas fir south; NLGA, WCLIB, or WWPA as indicated on the drawings or at minimum, Superior or C & Btr finish.
f. Southern pine; SPIB as indicated on the drawings or at minimum, B & B finish.
g. Western red cedar; NLGA, WCLIB, or WWPA as indicated on the drawings or at minimum, Grade A.

2. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.
3. Finger Jointing: as indicated on the drawings or, if not indicated on the drawings, Allowed.
4. Face Surface: as indicated on the drawings or at minimum, Surfaced smooth.

B. Hardwood Lumber Trim for Transparent Finish (Stain or Clear Finish):
1. Species and Grade: Red oak, maple; NHLA Clear A Finish.
2. Maximum Moisture Content: 9 percent.
3. Finger Jointing: Not allowed.
4. Gluing for Width: Not allowed. Use for lumber trim wider than 6 inches.
5. Veneered Material: Not allowed
6. Face Surface: Surfaced (smooth).
7. Matching: Selected for compatible grain and color.

C. Lumber Trim for Opaque Finish (Painted Finish):
1. Species and Grade:
a. Eastern white pine; NeLMA or NLGA, grade as indicated on the drawings or at minimum, Finish or 1 Common.
b. Idaho white, lodgepole, ponderosa, radiata, or sugar pine; NLGA or WWPA, grade as indicated on the drawings or at minimum, 1 Common.
c. Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine; NeLMA, NLGA, or WWPA, grade as indicated on the drawings or at minimum, Finish or 1 Common.
d. White woods; WWPA, grade as indicated on the drawings or at minimum, 1 Common.
e. Douglas fir-larch or Douglas fir south; NLGA, WCLIB, or WWPA, grade as indicated on the drawings or at minimum, Prime or D finish.
f. Spruce-pine-fir; NeLMA, NLGA, WCLIB, or WWPA, grade as indicated on the drawings or at minimum, 1 Common.
g. Alder, aspen, basswood, cottonwood, gum, magnolia, soft maple, sycamore, tupelo, or yellow poplar; NHLA, grade as indicated on the drawings or at minimum, A Finish.

2. Maximum Moisture Content for Softwoods: 15 percent.
3. Maximum Moisture Content for Hardwoods: 10 percent.
4. Finger Jointing: Allowed.
5. Face Surface: Surfaced as indicated on the drawings or at minimum, smooth.

6. Optional Material: Primed MDF of same actual dimensions as lumber indicated may be used in lieu of lumber only upon approval of architect.

D. Softwood Moldings for Transparent Finish (Stain or Clear Finish): MMPA WM 4, N-grade wood moldings. Made to patterns included in MMPA's "WM/Series Softwood Moulding Patterns."
   1. Species: Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine, Southern pine, Western red cedar or Douglas fir.
   2. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.
   3. Finger Jointing: Not allowed.
   4. Matching: Selected for compatible grain and color.

E. Hardwood Moldings for Transparent Finish (Stain or Clear Finish): MMPA WM 4, N-grade wood moldings made to patterns included in MMPA's "HWM/Series Hardwood Moulding Patterns."
   1. Species and Grade: Red oak, maple; NHLA Clear A Finish.
   2. Maximum Moisture Content: 9 percent.
   3. Finger Jointing: Not allowed.
   4. Matching: Selected for compatible grain and color.
   5. Optional Material: Kiln-dried softwood or MDF, with exposed surfaces veneered with species indicated, may be used in lieu of solid wood.

F. Moldings for Opaque Finish (Painted Finish): Made to patterns included in MMPA's "WM/Series Softwood Moulding Patterns."
   1. Softwood Moldings: MMPA WM 4, P grade.
      a. Species: Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine.
      b. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.
   2. Hardwood Moldings: MMPA WM 4, P-grade.
      a. Species: Aspen, basswood, cottonwood, gum, magnolia, soft maple, tupelo, or yellow poplar.
      b. Maximum Moisture Content: 9 percent.
   3. Finger Jointing: Allowed.
   4. Optional Material: Primed MDF.

G. PVC-Wrapped Moldings: MMPA WM 2 and made to patterns included in MMPA's "WM/Series Softwood Moulding Patterns."
   1. Colors, Textures, and Grain Patterns: As selected by Architect from manufacturer's full range.

H. Foam-Plastic Moldings: Molded product of shapes indicated, with a tough outer skin on exposed surfaces; factory primed. Exposed surfaces shall not be shaped after molding.
   1. Density: Not less than 20 lb./cu. ft..
   2. Flame-Spread Index: Not more than 75 when tested according to ASTM E84.
   3. Thickness: Not more than 1/2 inch.
   4. Width: Not more than 8 inches.
   5. Patterns: As indicated by manufacturer's designations.

2.4 PANELING

A. Hardwood Veneer Plywood Paneling: Manufacturer's stock hardwood plywood panels complying with HPVA HP-1.
   1. Face Veneer Species and Cut: Rotary-cut white birch or Plain-sliced red oak.
   2. Veneer Matching: Selected for similar color and grain.
   3. Backing Veneer Species: Any hardwood compatible with face species.
   4. Construction: Veneer core.
   5. Thickness: as indicated on the drawings or at minimum, 7/16 inch.
   6. Panel Size:
      a. As indicated on the drawings.
   7. Glue Bond: Type II (interior).
   8. Face Pattern: Manufacturer's standard channel-grooved pattern, with grooves at edges, center, and third points of panels, and at other locations to provide pattern resembling random-width boards.
   9. Finish: As selected by Architect from manufacturer's full range.

B. Hardboard Paneling: Interior factory-finished hardboard paneling complying with ANSI A135.5.
   1. Thickness: as indicated on the drawings or at minimum.
   2. Finish: As indicated on the drawings or, at minimum, Class I.
   3. Surface-Burning Characteristics: As follows, tested according to ASTM E84:
      a. Flame-Spread Index: 25 or less.
      b. Smoke-Developed Index: 450 or less.
   4. Colors, Textures, and Patterns: As selected by Architect from manufacturer's full range.

C. Board Paneling, MMPA: Interior wood-board paneling complying with MMPA WM 9.
   1. Species: Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine, Southern pine or Western red cedar.
   2. Grade: As indicated on the drawings or, at minimum, Clear No.
   3. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.
   4. Pattern: V-joint, tongue and groove, PT 82, Beaded ceiling, PT 85, Beveled-edge channel, shiplapped, PT 82 As indicated].
   5. Net Coverage Width: As indicated on the drawings or, at minimum, not less than 6-3/4 inches.

D. Board Paneling:
   1. Species and Grade:
      a. Eastern white pine; NeLMA or NLGA As indicated on the drawings or, at minimum, D Select.
      b. Idaho white, lodgepole, ponderosa, radiata, or sugar pine; NLGA or WWPA As indicated on the drawings or, at minimum, D Select.
      c. Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine; NeLMA, NLGA, or WWPA As indicated on the drawings or, at minimum, D Select (Quality.
      d. Southern pine; SPIB As indicated on the drawings or, at minimum, B & B Paneling.

e. Western red cedar; NLGA, WCLIB, or WWPA As indicated on the drawings or, at minimum, Grade A.

2. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.

3. Pattern:

a. V-joint, tongue and groove, NeLMA EWP 4SPIB SPP 54 or WWPA WP 4.

4. Net Coverage Width: As indicated on the drawings or, at minimum, not less than 6-3/4 inches.

2.5 SHELVING AND CLOTHES RODS

A. Exposed Closet Utility Shelving: Made from one of the following materials, 3/4 inch thick:

1. MDO softwood plywood with solid-wood edge.

2. Melamine-faced particleboard with applied-PVC front edge.

3. Wood boards as specified above for hardwood lumber trim for transparent finish.

4. Softwood Boards:

a. Kiln-dried eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine; NeLMA, NLGA, or WWPA as indicated on the drawings or, at minimum, D Select (Quality).

b. Kiln-dried Douglas fir-larch, Douglas fir south, or hem-fir; SPIB as indicated on the drawings or, at minimum, Prime or D finish; NLGA, WCLIB, or WWPA; or southern pine; B & B finish.

B. Shelf Cleats: 3/4-by-5-1/2-inch boards with hole and notch to receive clothes rods, as specified above for shelving.

C. Shelf Brackets with Rod Support: BHMA A156.16, B04051; prime-painted formed steel.

D. Shelf Brackets without Rod Support: BHMA A156.16, B04041; prime-painted formed steel.

E. Standards for Adjustable Shelf Brackets: BHMA A156.9, B04102; powder-coat-finished steel.

F. Adjustable Shelf Brackets: BHMA A156.9, B04112; powder-coat-finished steel.

G. Standards for Adjustable Shelf Supports: BHMA A156.9, B04071; powder-coat-finished steel.

H. Adjustable Shelf Supports: BHMA A156.9, B04081 or B04091; powder-coat-finished steel.

I. Wood Clothes Rods: 1-1/2-inch-diameter, clear, kiln-dried hardwood or Douglas.

J. Metal Clothes Rods: 1-5/16-inch-diameter, color-coated-steel tubes.

K. Wood Rod Flanges: Clear, kiln-dried,

L. Metal Rod Flanges: Stainless steel.

2.6 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.

B. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.

C. Installation Adhesive for Foam-Plastic Moldings: Product recommended for indicated use by foam-plastic molding manufacturer.

D. Paneling Adhesive: Comply with paneling manufacturer's written instructions for adhesives.

E. Multipurpose Construction Adhesive: Formulation, complying with ASTM D3498, that is recommended for indicated use by adhesive manufacturer.

2.7 FABRICATION

A. Back out or kerf backs of the following members, except those with ends exposed in finished work:

1. Interior standing and running trim, except shoe and crown molds.

2. Wood-board paneling.

B. 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 unless longer conditioning is recommended by manufacturer.

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 INSTALLATION OF STANDING AND RUNNING TRIM

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 at returns, miter at outside corners, and cope or miter at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint.
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 INSTALLATION OF PANELING

A. Plywood Paneling: Select and arrange panels on each wall to minimize noticeable variations in grain character and color between adjacent panels.

1. Leave 1/4-inch gap to be covered with trim at top, bottom, and openings.
2. Install with uniform tight joints between panels.
3. Attach panels to supports with manufacturer's recommended panel adhesive and fasteners.
4. Space fasteners and adhesive as recommended by panel manufacturer.
5. Conceal fasteners to greatest practical extent.

6. Arrange panels with grooves and joints over supports.
    a. Fasten to supports with nails of type and at spacing recommended by panel manufacturer.
    b. Use fasteners with prefinished heads matching groove color.

3.6 INSTALLATION OF SHELVING AND CLOTHES RODS

A. Cut shelf cleats at ends of shelves about 1/2 inch less than width of shelves and sand exposed ends smooth.
    1. Install shelf cleats by fastening to framing or backing with finish nails or trim screws, set below face and filled.
    2. Space fasteners not more than 16 inches o.c. Use two fasteners at each framing member or fastener location for cleats 4 inches nominal in width and wider.
    3. Apply a bead of multipurpose construction adhesive to back of shelf cleats before installing.
    4. Remove adhesive that is squeezed out after fastening shelf cleats in place.

B. Install shelf brackets according to manufacturer's written instructions, spaced not more than 32 inches o.c. Fasten to framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors.

C. Install standards for adjustable shelf supports according to manufacturer's written instructions. Fasten to framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors. Space fasteners not more than 12 inches o.c.

D. Install standards for adjustable shelf brackets according to manufacturer's written instructions, spaced not more than 36 inches o.c. and within 6 inches of ends of shelves. Fasten to framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors.

E. Cut shelves to neatly fit openings with only enough gap to allow shelves to be removed and reinstalled.
    1. Install shelves, fully seated on cleats, brackets, and supports.
    2. Fasten shelves to cleats with finish nails or trim screws, set flush.
    3. Fasten shelves to brackets to comply with bracket manufacturer's written instructions.

F. Install rod flanges for rods as indicated.
    1. Fasten to shelf cleats, framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors.
    2. Install rods in rod flanges.

3.7 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.

3.8 CLEANING

A. Clean interior finish carpentry on exposed and semi-exposed surfaces.

B. Restore damaged or soiled areas and touch up factory-applied finishes if any.

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 06 20 23

SECTION 07 01 50.19 - PREPARATION FOR REROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Full tear-off of roof system at areas indicated on Drawings.
   2. Partial tear-off of roof areas indicated on Drawings.
   3. Removal of flashings and counterflashings as indicated on Drawings.
   4. Temporary roofing.

B. Related Requirements:

   1. Section 01 10 00 "Summary" for use of premises and for phasing requirements.
   2. Section 01 50 00 "Temporary Facilities and Controls" for temporary construction and environmental-protection measures for reroofing preparation.
   3. Section 01 22 00 for complete unit price descriptions.

1.3 UNIT PRICES

A. Work of this Section is affected by roofing removal unit prices and flashing and counterflashing removal unit prices as indicated on drawings.

1.4 DEFINITIONS

A. EPS: Molded (expanded) polystyrene.

B. Full Roof Tear-off: Removal of existing roofing system down to existing roof deck.

C. OSB: Oriented strand board.

D. Partial Roof Tear-off: Removal of selected components and accessories from existing roofing system.

E. Roofing Terminology: Definitions in ASTM D1079 and glossary of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to work of this Section.

F. Roof Re-Cover Preparation: Existing roofing system is to remain and be prepared for new roof installed over it.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Meeting: Conduct meeting at project site. Conduct preinstallation meeting as part of general construction meeting or separately as necessary.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Temporary Roofing Submittal: Product data and description of temporary roofing system.

1. If temporary roof remains in place, include surface preparation requirements needed to receive permanent roof, and submit a letter from roofing manufacturer stating acceptance of the temporary roof and that its inclusion does not adversely affect the new roofing system's resistance to fire and wind or specified special warranty.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1. Include certificate that Installer is approved by warrantor of existing roofing system.
2. Include certificate that Installer is licensed to perform asbestos abatement.

B. Field Test Reports:

1. Fastener pull-out test report.

C. Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces, that might be misconstrued as having been damaged by reroofing operations.

1. Submit before Work begins.

D. Landfill Records: Indicate receipt and acceptance of demolished roofing materials and hazardous wastes, such as asbestos-containing materials, by a landfill facility licensed to accept them.

1.8 CLOSEOUT SUBMITTALS

A. Certified statement from manufacturer for existing warranted roof system stating that existing roof warranty has not been affected by Work performed under this Section.

1.9 QUALITY ASSURANCE

A. Installer Qualifications: Approved by warrantor of existing roofing system to work on existing roofing and licensed to perform asbestos abatement in the state or jurisdiction where Project is located.

B. Regulatory Requirements:

1. Comply with governing EPA notification regulations before beginning roofing removal.
2. Comply with hauling and disposal regulations of authorities having jurisdiction.

1.10 FIELD CONDITIONS

A. Existing Roofing System: Asphalt shingles.

B. Owner will occupy portions of building immediately below reroofing area.

1. Conduct reroofing so Owner's operations are not disrupted.
2. Provide Owner with not less than 72 hours' written notice of activities that may affect Owner's operations.
3. Coordinate work activities daily with Owner so Owner has adequate advance notice to place protective dust and water-leakage covers over sensitive equipment and furnishings, shut down HVAC and fire-alarm or -detection equipment if needed, and evacuate occupants from below work area.
4. Before working over structurally impaired areas of deck, notify Owner to evacuate occupants from below affected area.

a. Verify that occupants below work area have been evacuated before proceeding with work over impaired deck area.

C. Protect building to be reroofed, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.

D. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.

E. Conditions existing at time of inspection for bidding will be maintained by Owner as far as practical.
1. Construction Drawings and Project Manual for existing roofing system are provided for Contractor's convenience and information, but they are not a warranty of existing conditions. They are intended to supplement rather than serve in lieu of Contractor's own investigations. Contractor is responsible for conclusions derived from existing documents.

F. Limit construction loads on existing roof areas to remain, and existing roof areas scheduled to be reroofed for rooftop equipment wheel loads and for uniformly distributed loads.

G. Weather Limitations: Proceed with reroofing preparation only when existing and forecasted weather conditions permit Work to proceed without water entering existing roofing system or building.

1. Remove only as much roofing in one day as can be made watertight in the same day.

H. Hazardous Materials: It is not expected that hazardous materials, such as asbestos-containing materials, will be encountered in the Work.
   1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner.

      a. Hazardous materials will be removed by Owner under a separate contract.

1.11 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during reroofing, by methods and with materials so as not to void existing roofing system warranty.

   1. Notify warrantor before proceeding with the Work.
   2. Notify warrantor of existing roofing system on completion of reroofing and obtain documentation verifying that existing roofing system has been inspected and warranty remains in effect.

      a. Submit documentation at Project closeout.

PART 2 - PRODUCTS

2.1 TEMPORARY PROTECTION MATERIALS

A. EPS Insulation: ASTM C578.

B. Plywood: DOC PS 1, Grade CD, Exposure 1.

C. OSB: DOC PS 2, Exposure 1.

2.2 TEMPORARY ROOFING MATERIALS

A. Sheathing Paper: Red-rosin type, minimum 3 lb/100 sq. ft..

B. Base Sheet: ASTM D4601/D4601M, Type II, nonperforated, asphalt-impregnated and -coated, glass-fiber sheet.

C. Glass-Fiber Felts: ASTM D2178/D2178M, Type IV, asphalt-impregnated, glass-fiber felt.

D. Asphalt Primer: ASTM D41/D41M.

E. Roofing Asphalt: ASTM D312/D312M, Type III or IV.

F. Base Sheet Fasteners: Capped head, factory-coated steel fasteners, listed in FM Approvals' RoofNav.

2.3 INFILL AND REPLACEMENT MATERIALS

A. Use infill materials matching existing roofing system materials unless otherwise indicated.

1. Infill materials are specified in Section 07 31 13 "Asphalt Shingles" unless otherwise indicated.

B. Wood blocking, curbs and nailers are specified in Section 06 10 00 "Rough Carpentry

C. Plywood roof sheathing is specified in Section 06 16 00 "Sheathing."

D. Fasteners: Factory-coated steel fasteners with metal or plastic plates listed in FM Approvals' RoofNav, and acceptable to new roofing system manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protection of In-Place Conditions:

1. Protect existing roofing system that is not to be reroofed.
2. Loosely lay 1-inch-minimum thick, EPS insulation over existing roofing in areas not to be reroofed.

a. Loosely lay 15/32-inch plywood or OSB panels over EPS. Extend EPS past edges of plywood or OSB panels a minimum of 1 inch.

3. Limit traffic and material storage to areas of existing roofing that have been protected.
4. Maintain temporary protection and leave in place until replacement roofing has been completed. Remove temporary protection on completion of reroofing.
5. Comply with requirements of existing roof system manufacturer's warranty requirements.

B. Seal or isolate windows that may be exposed to airborne substances created in removal of existing materials.

C. Shut off rooftop utilities and service piping before beginning the Work.

D. Test existing roof drains to verify that they are not blocked or restricted.

1. Immediately notify Architect of any blockages or restrictions.

E. Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work.

1. Cover air-intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.

F. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.

G. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday.

1. Prevent debris from entering or blocking roof drains and conductors.

a. Use roof-drain plugs specifically designed for this purpose.
b. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.

2. If roof drains are temporarily blocked or unserviceable due to roofing system removal or partial installation of new roofing system, provide alternative drainage method to remove water and eliminate ponding.

a. Do not permit water to enter into or under existing roofing system components that are to remain.

3.2 ROOF TEAR-OFF

A. Lower removed roofing materials to ground and onto lower roof levels, using dust-tight chutes or other acceptable means of removing materials from roof areas.

B. Full Roof Tear-off: Where indicated on Drawings, remove existing roofing and other roofing system components down to the existing roof deck.
1. Remove base flashings and counter flashings.
2. Remove perimeter edge flashing and gravel stops.
3. Remove flashings at pipes, curbs, mechanical equipment, and other penetrations.
4. Remove wood blocking, curbs, and nailers.

5. Remove fasteners from deck.

C. Partial Roof Tear-off: Where indicated on drawings, remove selected components and accessories from existing roofing system.

1. Remove wet or damp materials below existing roofing and above deck as directed by Architect.

a. Removal is paid for by adjusting the Contract Sum according to unit prices included in the Contract Documents.

2. Inspect wood blocking, curbs, and nailers for deterioration and damage.

a. If wood blocking, curbs, or nailers have deteriorated, immediately notify Architect.
b. Removal is paid for by adjusting the Contract Sum according to unit prices included in the Contract Documents.

3. Remove fasteners from deck.

3.3 DECK PREPARATION

A. Inspect deck after tear-off of roofing system.

B. If broken or loose fasteners that secure deck panels to one another or to structure are observed, or if deck appears or feels inadequately attached, immediately notify Architect.

1. Do not proceed with installation until directed by Architect.

C. If deck surface is unsuitable for receiving new roofing or if structural integrity of deck is suspect, immediately notify Architect.

1. Do not proceed with installation until directed by Architect.

D. Provide additional deck securement as indicated on Drawings.

E. Replace plywood roof sheathing as indicated on Drawings.

1. Roof sheathing replacement will be paid for by adjusting the Contract Sum according to unit prices included in the Contract Documents.

3.4 INFILL MATERIALS INSTALLATION

A. Immediately after roof tear-off, and inspection and repair, if needed, of deck, fill in tear-off areas to match existing roofing system construction.

1. Installation of infill materials is specified in Section 07 31 13 "Asphalt Shingles."
2. Installation of wood blocking, curbs, and nailers is specified in Section 06 10 00 "Rough Carpentry".

B. Install new roofing patch over roof infill area.

1. If new roofing is installed the same day tear-off is made, roofing patch is not required.

3.5 TEMPORARY ROOFING

A. Install approved temporary roofing over area to be reroofed.

B. Remove temporary roofing before installing new roofing.

3.6 BASE FLASHING REMOVAL

A. Remove existing base flashings.

1. Clean substrates of contaminants, such as asphalt, sheet materials, dirt, and debris.

B. Do not damage metal counterflashings that are to remain.

1. Replace metal counterflashings damaged during removal with counterflashings of same metal, weight or thickness, and finish as existing, as specified in Section 07 62 00 "Sheet Metal Flashing and Trim."

3.7 FASTENER PULL-OUT TESTING

A. Perform fastener pull-out tests according to SPRI FX-1 and submit test report to Architect and roofing manufacturer before installing new roofing system.

1. Obtain Architect's and roofing manufacturer's approval to proceed with specified fastening pattern.

3.8 DISPOSAL

A. Collect demolished materials and place in containers.

1. Promptly dispose of demolished materials.
2. Do not allow demolished materials to accumulate on-site.
3. Storage or sale of demolished items or materials on-site is not permitted.

B. Transport and legally dispose of demolished materials off Owner's property.

END OF SECTION 07 01 50.19

SECTION 07 11 13 - BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Cold-applied, cut-back-asphalt dampproofing.
2. Cold-applied, emulsified-asphalt dampproofing.

B. Related Requirements:

1. Section 03 30 00 "Cast-in-Place Concrete" for bituminous vapor retarders under slabs-on-grade.
2. Section 07 13 26 "Self-Adhering Sheet Waterproofing” for waterproofing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 FIELD CONDITIONS

A. Weather Limitations: Proceed with application only when existing and forecasted weather conditions permit dampproofing to be performed according to manufacturers' written instructions.

PART 2 - PRODUCTS

2.1 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. Trowel Coats: ASTM D1227, Type II, Class 1.

B. Fibered Brush and Spray Coats: ASTM D1227, Type II, Class 1.

C. Brush and Spray Coats: ASTM D1227, Type III, Class 1.

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.

E. Protection Course: ASTM D6506, semirigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners.

1. Thickness: Nominal 1/8 inch.
2. Adhesive: Rubber-based solvent type recommended in writing by waterproofing manufacturer for protection course type.

2.5 MOLDED-SHEET DRAINAGE PANELS

A. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel: Composite subsurface drainage panel acceptable to dampproofing manufacturer and consisting of a studded, nonbiodegradable, molded-plastic-sheet drainage core; with a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 sieve laminated to one side of the core, with or without a polymeric film bonded to the other side; and with a vertical flow rate through the core of 9 to 21 gpm per ft.

2.6 INSULATION DRAINAGE PANELS

A. Insulation Drainage Panels: Unfaced or geotextile-faced, extruded-polystyrene board insulation according to ASTM C578, Type IV, 25-psi, or Type VI, 40-psi, minimum

compressive strength; fabricated with shiplap or channel edges and with one side having grooved drainage channels.

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.

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.

C. Where dampproofing exterior face of inner wythe of exterior masonry cavity walls, lap dampproofing at least 1/4 inch onto flashing, masonry reinforcement, veneer ties, and other items that penetrate inner wythe.

1. Extend dampproofing over outer face of structural members and concrete slabs that interrupt inner wythe.
2. Lap dampproofing at least 1/4 inch onto shelf angles supporting veneer.

D. Where dampproofing interior face of above-grade, exterior concrete walls, continue dampproofing through intersecting walls by keeping vertical mortar joints at intersection temporarily open or by dampproofing wall before constructing intersecting walls.

3.4 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

A. Concrete Foundations: Apply two 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 or one trowel coat at not less than 4 gal./100 sq. ft.

B. Unexposed Face of Concrete Retaining Walls: Apply one brush or spray coat at not less than 1.25 gal./100 sq. ft..

C. Interior Face of Exterior Concrete Walls: Where above grade and indicated to be furred and finished, apply one brush or spray coat at not less than 1 gal./100 sq. ft..

3.5 PROTECTION COURSE INSTALLATION

A. Install protection course over completed-and-cured dampproofing. Comply with dampproofing-material and protection-course manufacturers' written instructions for attaching protection course.

1. Support protection course over cured coating with spot application of adhesive type recommended in writing by protection-board manufacturer.
2. Install protection course within 24 hours of dampproofing installation (while coating is tacky) to ensure adhesion.

3.6 DRAINAGE PANEL INSTALLATION

A. Molded- Sheet Drainage Panels: Install panels, with geotextile facing away from wall substrate, according to manufacturer's written instructions. Use adhesive or another method that does not penetrate dampproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.

1. Install thermal insulation specified in Section 07 21 00 "Thermal Insulation before installing drainage panels.

B. Insulation Drainage Panels: Install panels over dampproofed surfaces. Use adhesive or another method that does not penetrate dampproofing. Cut and fit panels to within 3/4 inch of projections and penetrations.

1. Ensure that drainage channels are aligned and free of obstructions.

3.7 PROTECTION

A. Protect installed insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where panels are subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

B. Correct dampproofing that does not comply with requirements; repair substrates and reapply dampproofing.

END OF SECTION 07 11 13

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Blindside sheet waterproofing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, and tested physical and performance properties of waterproofing.
2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Research Reports: For modified bituminous sheet waterproofing/termite barrier, showing compliance with ICC AC380.

C. Field quality-control reports.

D. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

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

1.6 FIELD CONDITIONS

A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended in writing by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.

1. Do not apply waterproofing in snow, rain, fog, or mist.

B. Maintain adequate ventilation during preparation and application of waterproofing materials.

1.7 WARRANTY

A. Manufacturer's Warranty:

1. Waterproofing Warranty: Manufacturer agrees to furnish replacement waterproofing material for waterproofing that does not comply with requirements or that fails to remain watertight within specified warranty period.

a. Warranty Period: Three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Waterproofing System: Obtain waterproofing materials from single source from single manufacturer.

2.2 BLINDSIDE SHEET WATERPROOFING

A. Blindside Sheet Waterproofing for Vertical Applications: Uniform, flexible, multilayered-composite sheet membrane that forms a permanent bond with fresh concrete placed against it; complete with accessories and preformed shapes for an unbroken waterproofing assembly; with the following physical properties:

1. Physical Properties:

a. Low-Temperature Flexibility: Pass at minus 20 deg F; ASTM D1970/D1970M.
b. Peel Adhesion to Concrete: 5 lbf/in. minimum; ASTM D903, modified.
c. Lap Adhesion: 5 lbf/in. minimum; ASTM D1876, modified.
d. Hydrostatic-Head Resistance: 230 feet; ASTM D5385, modified.
e. Puncture Resistance: 100 lbf minimum; ASTM E154/E154M.
f. Water Vapor Permeance: 0.1 perm maximum; ASTM E96/E96M, Water Method.
g. Ultimate Elongation: 335 percent minimum; ASTM D412, modified.

B. Mastic, Adhesives, and Detail Tape: Liquid mastic and adhesives, and adhesive tapes recommended by waterproofing manufacturer.

2.3 AUXILIARY MATERIALS

A. Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.

1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.

B. Primer: Liquid waterborne or solvent-borne primer recommended for substrate by sheet waterproofing material manufacturer.

C. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by sheet waterproofing material manufacturer.

D. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, of trowel grade or low viscosity.

E. Substrate Patching Membrane: Low-viscosity, two-component, modified asphalt coating.

F. Metal Termination Bars: Aluminum bars, approximately 1 by 1/8 inch, predrilled at 9-inch centers.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of waterproofing.

1. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.
2. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method according to ASTM D4263.
3. Verify that compacted subgrade is dry, smooth, sound, and ready to receive waterproofing sheet.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.

B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

D. Remove fins, ridges, mortar, and other projections.

E. Fill form tie holes, honeycomb, aggregate pockets, holes, and other voids.

F. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D4258.

1. Install sheet strips of width according to manufacturer's written instructions and center over treated construction and contraction joints and cracks exceeding a width of 1/16 inch.

G. Bridge and cover isolation joints, expansion joints, and discontinuous deck-to-wall and deck-to-deck joints with overlapping sheet strips of widths according to manufacturer's written instructions.

1. Invert and loosely lay first sheet strip over center of joint. Firmly adhere second sheet strip to first and overlap to substrate.

H. Corners: Prepare, prime, and treat inside and outside corners in accordance with manufacturer's instructions.

1. Install membrane strips centered over vertical inside corners. Install 3/4-inch fillets of liquid membrane on horizontal inside corners and as follows:

a. At footing-to-wall intersections, extend liquid membrane in each direction from corner or install membrane strip centered over corner.
b. At plaza-deck-to-wall intersections, extend liquid membrane or sheet strips onto deck waterproofing and to finished height of sheet flashing.

I. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions.

3.3 INSTALLATION OF BLINDSIDE SHEET WATERPROOFING

A. Install blindside sheet waterproofing according to manufacturer's written instructions.

B. Place and secure molded-sheet drainage panels over substrate. Lap edges and ends of geotextile to maintain continuity.

C. Vertical Applications: Install sheet with face against substrate. Accurately align sheets and maintain uniform side and end laps of minimum dimensions required by membrane manufacturer. Overlap and seal seams, and stagger and tape end laps to ensure watertight installation. Mechanically fasten to substrate.

1. Securely fasten top termination of membrane with continuous metal termination bar anchored into substrate and cover with detail tape.

D. Corners: Seal lapped terminations and cut edges of sheet waterproofing at inside and outside corners with detail tape.

E. Seal penetrations through sheet waterproofing to provide watertight seal with detail tape patches or wraps and a liquid-membrane troweling.

F. Install sheet waterproofing and auxiliary materials to produce a continuous watertight tie into adjacent waterproofing.

G. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Tape perimeter of damaged or nonconforming area extending 6 inches beyond repaired areas in all directions. Apply a patch of sheet waterproofing and firmly secure with detail tape.

3.4 PROTECTION, REPAIR, AND CLEANING

A. Do not permit foot or vehicular traffic on unprotected membrane.

B. Protect waterproofing from damage and wear during remainder of construction period.

C. Protect installed insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

D. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

E. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION 07 13 26

SECTION 07 19 00 - WATER REPELLENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes penetrating water-repellent treatments for the following vertical and horizontal surfaces:

1. Cast-in-place concrete.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's printed statement of VOC content.
2. Include manufacturer's recommended number of coats for each type of substrate and spreading rate for each separate coat.

1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of water repellent.

B. Field quality-control reports.

C. Sample Warranty: For special warranty.

1.5 QUALITY ASSURANCE

A. Applicator Qualifications: An employer of workers trained and approved by manufacturer.

1.6 FIELD CONDITIONS

A. Limitations: Proceed with application only when the following existing and forecasted weather and substrate conditions permit water repellents to be applied according to manufacturers' written instructions and warranty requirements:

1. Concrete surfaces and mortar have cured for not less than 28 days.

2. Building has been closed in for not less than 30 days before treating wall assemblies.
3. Ambient temperature is above 40 deg F and below 100 deg F and will remain so for 24 hours.
4. Substrate is not frozen and substrate-surface temperature is above 40 deg F and below 100 deg F.
5. Rain or snow is not predicted within 24 hours.
6. Not less than seven days have passed since surfaces were last wet.
7. Windy conditions do not exist that might cause water repellent to be blown onto vegetation or surfaces not intended to be treated.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace materials that fail to maintain water repellency specified in "Performance Requirements" Article within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Performance: Water repellents shall meet the following performance requirements as determined by testing on manufacturer's standard substrates representing those indicated for this Project.

B. Water Absorption: Minimum 80 percent reduction of water absorption after 24 hours for treated compared to untreated specimens when tested according to the following:

1. Cast-in-Place Concrete: ASTM C642.

C. Water-Vapor Transmission: Comply with one or both of the following:

1. Maximum 10 percent reduction water-vapor transmission of treated compared to untreated specimens, according to ASTM E96/E96M.
2. Minimum 80 percent water-vapor transmission of treated compared to untreated specimens, according to ASTM D1653.

D. Durability: Maximum 5 percent loss of water-repellent performance after 2500 hours of weathering according to ASTM G154 compared to water-repellent-treated specimens before weathering.

E. Chloride-Ion Intrusion in Concrete: NCHRP Report 244, Series II tests.

1. Reduction of Water Absorption: 80 percent.
2. Reduction in Chloride Content: 80 percent.

2.2 PENETRATING WATER REPELLENTS

A. Silane, Penetrating Water Repellent: Clear, containing 20 percent or more solids of alkyltrialkoxysilanes; with alcohol, mineral spirits, water, or other proprietary solvent carrier; and with 400 g/L or less of VOCs.

B. Siloxane, Penetrating Water Repellent: Clear, containing 10 percent or more solids of oligomerous alkylalkoxysiloxanes; with alcohol, ethanol, mineral spirits, water, or other proprietary solvent carrier; and with 400 g/L or less of VOCs.

C. Silane/Siloxane-Blend, Penetrating Water Repellent: Clear, silane and siloxane blend with 400 g/L or less of VOCs.

D. Siliconate, Penetrating Water Repellent: Clear, methyl siliconate water repellent with 400 g/L or less of VOCs.

E. Proprietary-Blend, Penetrating Water Repellent: Clear, consisting of one or several different resins (silanes or siloxanes), polymers, stearates, or oils plus other compounds or products of components; with 400 g/L or less of VOCs.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements and conditions affecting performance of the Work.

1. Verify that surfaces are clean and dry according to water-repellent manufacturer's requirements. Check moisture content in three representative locations by method recommended by manufacturer.
2. Verify that there is no efflorescence or other removable residues that would be trapped beneath the application of water repellent.
3. Verify that required repairs are complete, cured, and dry before applying water repellent.

B. Test pH level according to water-repellent manufacturer's written instructions to ensure chemical bond to silica-containing or siliceous minerals.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. New Construction and Repairs: Allow concrete and other cementitious materials to age before application of water repellent, according to repellent manufacturer's written instructions.

B. Cleaning: Before application of water repellent, clean substrate of substances that could impair penetration or performance of product according to water-repellent manufacturer's written instructions and as follows:

1. Cast-in-Place Concrete; Remove oil, curing compounds, laitance, and other substances that inhibit penetration or performance of water repellents according to ASTM E1857.

C. Protect adjoining work, including mortar and sealant bond surfaces, from spillage or blow-over of water repellent. Cover adjoining and nearby surfaces of aluminum and glass if there is the possibility of water repellent being deposited on surfaces. Cover live vegetation.

D. Coordination with Sealant Joints: Do not apply water repellent until sealants for joints adjacent to surfaces receiving water-repellent treatment have been installed and cured.

1. Water-repellent work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using substrate, water repellent, and sealant materials identical to those required.

3.3 APPLICATION

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect the substrate before application of water repellent and to instruct Applicator on the product and application method to be used.

B. Apply coating of water repellent on surfaces to be treated using 15 psi-pressure spray with a fan-type spray nozzle, roller, or brush to the point of saturation. Apply coating in dual passes of uniform, overlapping strokes. Remove excess material; do not allow material to puddle beyond saturation. Comply with manufacturer's written instructions for application procedure unless otherwise indicated.

C. Apply a second saturation coating, repeating first application. Comply with manufacturer's written instructions for limitations on drying time between coats and after rainstorm wetting of surfaces between coats. Consult manufacturer's technical representative if written instructions are not applicable to Project conditions.

3.4 CLEANING

A. Immediately clean water repellent from adjoining surfaces and surfaces soiled or damaged by water-repellent application as work progresses. Correct damage to work of other trades caused by water-repellent application, as approved by Architect.

B. Comply with manufacturer's written cleaning instructions.

END OF SECTION 07 19 00

SECTION 07 21 00 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Extruded polystyrene foam-plastic board.
2. Polyisocyanurate foam-plastic board.
3. Glass-fiber blanket.
4. Glass-fiber board.
5. Mineral-wool blanket.
6. Mineral-wool board.
7. Loose-fill insulation.
8. Spray-applied cellulosic insulation.

B. Related Requirements:
1. Section 06 16 00 "Sheathing" for foam-plastic board sheathing installed directly over wood or steel framing.
2. Section 07 13 26 "Self-Adhering Sheet Waterproofing"
3. Section 07 52 16 "Styrene-Butadiene-Styrene (SBS) Modified Bituminous Membrane Roofing"
4. Section 09 29 00 "Gypsum Board" for sound attenuation blanket used as acoustic insulation.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each product, for tests performed by a qualified testing agency.

B. Evaluation Reports: For foam-plastic insulation, from ICC-ES.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect foam-plastic board insulation as follows:

1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD

A. Extruded polystyrene boards in this article are also called "XPS boards." Roman numeral designators in ASTM C 578 are assigned in a fixed random sequence, and their numeric order does not reflect increasing strength or other characteristics.

B. Extruded Polystyrene Board, Type X as indicated on the drawings: ASTM C 578, Type X, 15-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.

1. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

C. Extruded Polystyrene Board, Type IV as indicated on the drawings: ASTM C 578, Type IV, 25-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.

1. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

D. Extruded Polystyrene Board, Type IV, Drainage Panels as indicated on the drawings: ASTM C 578, Type IV, 25-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84; fabricated with shiplap or channel edges and with one side having grooved drainage channels.

E. Extruded Polystyrene Board, Type VI as indicated on the drawings: ASTM C 578, Type VI, 40-psi minimum compressive strength; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.

F. Extruded Polystyrene Board, Type VI, Drainage Panels as indicated on the drawings: ASTM C 578, Type VI, 40-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84; fabricated with shiplap or channel edges and with one side having grooved drainage channels.

G. Extruded Polystyrene Board, Type VII as indicated on the drawings: ASTM C 578, Type VII, 60-psi minimum compressive strength; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.

H. Extruded Polystyrene Board, Type VII, Drainage Panels as indicated on the drawings: ASTM C 578, Type VII, 60-psi minimum compressive strength; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84; fabricated with shiplap or channel edges and with one side having grooved drainage channels.

I. Extruded Polystyrene Board, Type V as indicated on the drawings: ASTM C 578, Type V, 100-psi minimum compressive strength; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.

2.2 MOLDED POLYSTYRENE FOAM-PLASTIC BOARD

A. Molded Polystyrene Board, Type I as indicated on the drawings: ASTM C 578, Type I, 10-psi minimum compressive strength.

B. Molded Polystyrene Board, Type VIII as indicated on the drawings: ASTM C 578, Type VIII, 13-psi minimum compressive strength.

C. Molded Polystyrene Board, Type II as indicated on the drawings: ASTM C 578, Type II, 15-psi minimum compressive strength.

D. Molded Polystyrene Board, Type IX as indicated on the drawings: ASTM C 578, Type IX, 25-psi minimum compressive strength.

E. Molded Polystyrene Board, Type XIV as indicated on the drawings: ASTM C 578, Type XIV, 40-psi minimum compressive strength.

F. Molded Polystyrene Board, Type XV as indicated on the drawings: ASTM C 578, Type XV, 60-psi minimum compressive strength.

2.3 POLYISOCYANURATE FOAM-PLASTIC BOARD

A. Polyisocyanurate Board, Foil Faced as indicated on the drawings: ASTM C 1289, foil faced, Type I, Class 1 or 2.

1. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

B. Polyisocyanurate Board, Glass-Fiber-Mat Faced as indicated on the drawings: ASTM C 1289, glass-fiber-mat faced, Type II, Class 2.

1. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

2.4 GLASS-FIBER BLANKET

A. Glass-Fiber Blanket, Unfaced as indicated on the drawings: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

B. Glass-Fiber Blanket, Polypropylene-Scrim-Kraft Faced as indicated on the drawings: ASTM C 665, Type II (nonreflective faced), Class A (faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier).

C. Glass-Fiber Blanket, Kraft Faced as indicated on the drawings: ASTM C 665, Type II (nonreflective faced), Class C (faced surface not rated for flame propagation); Category 1 (membrane is a vapor barrier).

D. Glass-Fiber Blanket, Reinforced-Foil Faced as indicated on the drawings: ASTM C 665, Type III (reflective faced), Class A (faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.

E. Glass-Fiber Blanket, Foil Faced as indicated on the drawings: ASTM C 665, Type III (reflective faced), Class B (faced surface with a flame-propagation resistance of 0.12 W/sq. cm); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.

2.5 GLASS-FIBER BOARD

A. Glass-Fiber Board, Unfaced as indicated on the drawings: ASTM C 612, Type IA; unfaced, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84. Nominal density of 2.25 lb/cu. ft, thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F.

B. Glass-Fiber Board, Faced as indicated on the drawings: ASTM C 612, Type IA; faced on one side with foil-scrim-kraft or foil-scrim-polyethylene vapor retarder, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84. Nominal density of 2.25 lb/cu. ft., thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F.

C. Glass-Fiber Board, Unfaced as indicated on the drawings: ASTM C 612, Type IA; unfaced, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84. Nominal density of 3 lb/cu. ft., thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F.

D. Glass-Fiber Board, Faced as indicated on the drawings: ASTM C 612, Type IA; faced on one side with foil-scrim-kraft or foil-scrim-polyethylene vapor retarder, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84.

Nominal density of 3 lb/cu. ft., thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F.

E. Glass-Fiber Board, Unfaced as indicated on the drawings: ASTM C 612, Type IA; unfaced, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84. Nominal density of 4.25 lb/cu. ft., thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F.

F. Glass-Fiber Board, Faced as indicated on the drawings: ASTM C 612, Type IA; faced on one side with foil-scrim-kraft or foil-scrim-polyethylene vapor retarder, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84. Nominal density of 4.25 lb/cu. ft., thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F.

G. Glass-Fiber Board, Unfaced as indicated on the drawings: ASTM C 612, Type IA; unfaced, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84. Nominal density of 6 lb/cu. ft., thermal resistivity of 4.4 deg F x h x sq. ft./Btu x in. at 75 deg F.

H. Glass-Fiber Board, Faced as indicated on the drawings: ASTM C 612, Type IA; faced on one side with foil-scrim-kraft or foil-scrim-polyethylene vapor retarder, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84. Nominal density of 6 lb/cu. ft., thermal resistivity of not less than 4.34 deg F x h x sq. ft./Btu x in. at 75 deg F.

2.6 MINERAL-WOOL BLANKETS

A. Mineral-Wool Blanket, Unfaced as indicated on the drawings: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

B. Mineral-Wool Blanket, Reinforced-Foil Faced as indicated on the drawings: ASTM C 665, Type III (reflective faced), Class A (faced surface with a flame-spread index of 25 or less per ASTM E 84); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.

2.7 MINERAL-WOOL BOARD

A. Mineral-Wool Board, Types IA and IB, Unfaced as indicated on the drawings: ASTM C 612, Types IA and IB; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics. Nominal density of 4 lb/cu. ft..

B. Mineral-Wool Board, Types IA and IB, Faced as indicated on the drawings: ASTM C 612, Types IA and IB; faced on one side with foil-scrim or foil-scrim-polyethylene vapor retarder; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E 84. Nominal density of 4 lb/cu. ft..

C. Mineral-Wool Board, Type II, Unfaced as indicated on the drawings: ASTM C 612, Type II; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics. Nominal density of 6 lb/cu. ft..

D. Mineral-Wool Board, Type II, Faced as indicated on the drawings: ASTM C 612, Type II; faced on one side with foil-scrim or foil-scrim-polyethylene vapor retarder; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E 84. Nominal density of 6 lb/cu. ft..

E. Mineral-Wool Board, Type III, Unfaced as indicated on the drawings: ASTM C 612, Type III; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics. Nominal density of 8 lb/cu. ft..

F. Mineral-Wool Board, Type III, Faced as indicated on the drawings: ASTM C 612, Type III; faced on one side with foil-scrim or foil-scrim-polyethylene vapor retarder; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E 84. Nominal density of 8 lb/cu. ft..

2.8 LOOSE-FILL INSULATION

A. Cellulosic-Fiber Loose-Fill Insulation as indicated on the drawings: ASTM C 739, chemically treated for flame-resistance, processing, and handling characteristics.

B. Glass-Fiber Loose-Fill Insulation as indicated on the drawings: ASTM C 764, Type I for pneumatic application or Type II for poured application; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E 84.

2.9 SPRAY-APPLIED CELLULOSIC INSULATION

A. Self-Supported, Spray-Applied Cellulosic Insulation as indicated on the drawings: ASTM C 1149, Type I (materials applied with liquid adhesive; suitable for either exposed or enclosed applications), Type II (materials containing a dry adhesive activated by water during installation; intended only for enclosed or covered applications), Type III (materials containing an adhesive mixed with water during application; intended for application on attic floors), chemically treated for flame-resistance, processing, and handling characteristics.

2.10 INSULATION FASTENERS

A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.

1. Plate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.

2. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch in diameter; length to suit depth of insulation.

B. Adhesively Attached, Angle-Shaped, Spindle-Type Anchors: Angle welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.

1. Angle: Formed from 0.030-inch-thick, perforated, galvanized carbon-steel sheet with each leg 2 inches square.
2. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch in diameter; length to suit depth of insulation.

C. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.

1. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in the following locations:

a. Crawl spaces.
b. Ceiling plenums.
c. Attic spaces.

D. Insulation Standoff: Spacer fabricated from galvanized mild-steel sheet for fitting over spindle of insulation anchor to maintain air space (as indicated on the drawings) between face of insulation and substrate to which anchor is attached.

E. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates without damaging insulation, fasteners, or substrates.

2.11 ACCESSORIES

A. Insulation for Miscellaneous Voids:

1. Glass-Fiber Insulation: ASTM C 764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E 84.
2. Spray Polyurethane Foam Insulation: ASTM C 1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.

B. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

C. Asphalt Coating for Cellular-Glass Block Insulation: Cutback asphalt or asphalt emulsion of type recommended by manufacturer of cellular-glass block insulation.

D. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide ventilation between insulated attic spaces and vented eaves.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. 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 vertical slab edge and 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 24 inches below exterior grade line.

B. 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 24 inches in from exterior walls.

3.4 INSTALLATION OF FOUNDATION WALL INSULATION

A. Butt panels together for tight fit.

B. Anchor Installation: Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:

1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application.

2. Apply insulation standoffs to each spindle to create cavity width indicated on Drawings between concrete substrate and insulation.
3. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation.
4. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.

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.
3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
4. Attics: Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
5. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
6. For wood-framed construction, install blankets according to ASTM C 1320 and as follows:

    a. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.

7. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings and seal each continuous area of insulation to ensure airtight installation.

    a. Exterior Walls: Set units with facing placed as indicated on Drawings.
    b. Interior Walls: Set units with facing placed as indicated on Drawings.

B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft..
2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

C. Loose-Fill Insulation: Apply according to ASTM C 1015 and manufacturer's written instructions. Level horizontal applications to uniform thickness as indicated, lightly settle to uniform density, but do not compact excessively.

1. For cellulosic-fiber loose-fill insulation, comply with CIMA's Bulletin #2, "Standard Practice for Installing Cellulose Insulation."

D. Spray-Applied Cellulosic Insulation: Apply spray-applied insulation according to manufacturer's written instructions. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked. After insulation is applied, make flush with face of studs by using method recommended by insulation manufacturer.

3.6 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07 21 00

SECTION 07 25 00 - WEATHER BARRIERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Building paper.
2. Building wrap.
3. Flexible flashing.
4. Drainage material.

1.3 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.

B. Shop Drawings: Show details of building wrap at terminations, openings, and penetrations. Show details of flexible flashing applications.

1.4 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For water-resistive barrier and flexible flashing, from ICC-ES.

PART 2 - PRODUCTS

2.1 WATER-RESISTIVE BARRIER

A. Building Paper: ASTM D226, Type 1 (No. 15 asphalt-saturated organic felt), unperforated.

B. Building Paper: Water-vapor-permeable, asphalt-saturated kraft building paper that complies with ICC-ES AC38, Grade D**.**

C. Building Wrap: ASTM E1677, Type I air barrier; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E84; UV stabilized; and acceptable to authorities having jurisdiction.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. CertainTeed Company.
2. Water-Vapor Permeance: Not less than 75 perms per ASTM E96/E96M, Desiccant Method (Procedure A).
3. Air Permeance: Not more than 0.004 cfm/sq. ft. at 0.3-inch wg when tested according to ASTM E2178.
4. Allowable UV Exposure Time: Not less than three months.
5. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.
6. CertaWrap Weather-Protection Membrane.

D. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

2.2 FLEXIBLE FLASHING

A. Butyl Rubber Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   a. Certainteed Company
   b. DuPont Safety & Construction.
   c. Raven Industries, Inc.
   d. TYPAR.
2. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.

B. Rubberized-Asphalt 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 to produce an overall thickness of not less than 0.025 inch.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. CertainTeed Company.
   b. Carlisle Coatings & Waterproofing Inc.
   c. TYPAR.

2. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.

C. Primer for Flexible Flashing: Product recommended in writing by flexible flashing manufacturer for substrate.

D. Nails and Staples: Product recommended in writing by flexible flashing manufacturer and complying with ASTM F1667.

2.3 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, portland cement plaster or adhered masonry veneer as indicated on the drawings.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. CertainTeed Company
   b. DuPont. (Tyvek Stuccowrap , Tyvek Drainwrap)
   c. Barricade Building Products (Barricade Drainage Wrap)
   d. Fortifiber Building Systems Group (Two-Ply HydroTEX Drainable WRB, Weathersmart Drainable)
   e. Tamlyn (TamlynWrap Drainable Housewrap)
   f. Benjamin Obdyke (HYDROGAP Drainable Housewrap)
   g. National Shelter Products (DRYline RainDrain Commercial-Grade Building Wrap)
   h. Kingspan (Kingspan GreenGuard RainDrop 3D Building Wrap)
   i. Kimberly-Clark (BLOCK-IT House Wrap)
2. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.

PART 3 - EXECUTION

3.1 WATER-RESISTIVE BARRIER INSTALLATION

A. Cover exposed exterior surface of sheathing with water-resistive barrier securely fastened to framing immediately after sheathing is installed.

B. Cover sheathing with water-resistive barrier as follows:

1. Cut back barrier 1/2 inch on each side of the break in supporting members at expansion- or control-joint locations.
2. Apply barrier to cover vertical flashing with a minimum 4-inch overlap unless otherwise indicated.

C. Building Paper: Apply horizontally with a 2-inch overlap and a 6-inch end lap; fasten to sheathing with galvanized staples or roofing nails.

D. Building Wrap: Comply with manufacturer's written instructions and warranty requirements.

1. Seal seams, edges, fasteners, and penetrations with tape.
2. Extend into jambs of openings and seal corners with tape.

3.2 FLEXIBLE FLASHING INSTALLATION

A. Apply flexible flashing where indicated to comply with manufacturer's written instructions.

1. Prime substrates as recommended by flashing manufacturer.
2. Lap seams and junctures with other materials at least 4 inches except that at flashing flanges of other construction, laps need not exceed flange width.
3. Lap flashing over water-resistive barrier at bottom and sides of openings.
4. Lap water-resistive barrier over flashing at heads of openings.
5. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

3.3 DRAINAGE MATERIAL INSTALLATION

A. Install drainage material over building wrap and flashing to comply with manufacturer's written instructions.

END OF SECTION 07 25 00

SECTION 07 26 00 - VAPOR RETARDERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Polyethylene vapor retarders.
2. Reinforced-polyethylene vapor retarders.
3. Fire-retardant, reinforced-polyethylene vapor retarders.

B. Related Requirements:

1. Section 03 30 00 "Cast-in-Place Concrete" for under-slab vapor retarders.
2. Section 07 21 00 "Thermal Insulation" for vapor retarders integral with insulation products.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each product, for tests performed by a qualified testing agency.

PART 2 - PRODUCTS

2.1 POLYETHYLENE VAPOR RETARDERS

A. Polyethylene Vapor Retarders: ASTM D4397, As indicated on drawings or, at minimum, 10-mil thick sheet, with maximum permeance rating of 0.1 perm.

2.2 REINFORCED-POLYETHYLENE VAPOR RETARDERS

A. Reinforced-Polyethylene Vapor Retarders: Sheet with outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nylon cord or polyester scrim

and weighing not less than 20 lb/1000 sq. ft, with maximum permeance rating of 0.1 perm.

2.3 FIRE-RETARDANT, REINFORCED-POLYETHYLENE VAPOR RETARDERS

A. Fire-Retardant, Reinforced-Polyethylene Vapor Retarders: Sheet with outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nonwoven grid of nylon cord or polyester scrim and weighing not less than 20 lb/1000 sq. ft., with maximum permeance rating of 0.1 perm.

1. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indexes of 75 and 200, respectively, per ASTM E84.

2.4 ACCESSORIES

A. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

B. Adhesive for Vapor Retarders: Product recommended by vapor-retarder manufacturer and has demonstrated capability to bond vapor retarders securely to substrates indicated.

C. Vapor-Retarder Fasteners: Pancake-head, self-tapping steel drill screws; with fender washers.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to vapor retarders, including removing projections capable of puncturing vapor retarders.

3.2 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.

3.3 INSTALLATION OF VAPOR RETARDERS IN CRAWL SPACES

A. Install vapor retarders over prepared grade. Lap joints a minimum of 12 inches and seal with manufacturer's recommended tape. Install second layer over pathways to equipment.

B. Extend vapor retarder over footings and seal to foundation wall or grade beam with manufacturer's recommended tape.

1. Extend vapor retarder vertically minimum 24 inches above top of footing.

C. Seal around penetrations such as utilities and columns in order to create a monolithic, airtight membrane at grade surface, perimeter, and all vertical penetrations.

3.4 PROTECTION

A. Protect vapor retarders from damage until concealed by permanent construction.

END OF SECTION 07 26 00

SECTION 07 31 13 - ASPHALT SHINGLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Glass-fiber-reinforced asphalt shingles.
2. Underlayment materials.
3. Ridge vents.
4. Metal flashing and trim.

B. Related Requirements:

1. Section 07 72 00 "Roof Accessories" for roof ventilators.

1.2 ALLOWANCES

A. See Section 01 21 00 "Allowances" for description of allowances affecting items specified under this Section.

1.3 DEFINITIONS

A. Roofing Terminology: See ASTM D1079 for definitions of terms related to roofing Work in this Section.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct meeting at project site. Conduct preinstallation meeting as part of general construction meeting or separately as necessary.

1.5 ACTION SUBMITTALS

A. Product Data: For the following:

1. Asphalt shingles.
2. Underlayment materials.
3. Ridge vents.
4. Asphalt roofing cement.
5. Elastomeric flashing sealant.

B. Shop Drawings: For metal flashing and trim.

C. Samples: For each exposed product and for each color and blend specified, in sizes indicated.

1. Asphalt Shingles: Full size.
2. Ridge and Hip Cap Shingles: Full size.
3. Ridge Vent: 12-inch-long Sample.
4. Exposed Valley Lining: 12 inches square.

D. Samples for Initial Selection:

1. For each type of asphalt shingle indicated.
2. For each type of accessory involving color selection.

E. Samples for Verification: For the following products, in sizes indicated:

1. Asphalt Shingles: Full size.
2. Ridge and Hip Cap Shingles: Full size.
3. Ridge Vent: 12-inch-long Sample.
4. Exposed Valley Lining: 12 inches square.

1.6 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 manufacturer and witnessed by a qualified testing agency.

C. Research Reports: For synthetic underlayment, from an agency acceptable to authorities having jurisdiction, indicating that product is suitable for intended use under applicable building codes.

D. Sample Warranty: For manufacturer's materials warranty.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For asphalt shingles to include in maintenance manuals.

B. Materials warranties.

C. Roofing Installer's warranty.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Asphalt Shingles: 100 sq. ft. of each type and in each color and blend, in unbroken bundles.

1.9 QUALITY ASSURANCE

A. Installer Qualifications: An authorized installer who is trained and approved by manufacturer.

1.10 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.

1.11 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.

1.12 WARRANTY

A. Materials Warranty: Manufacturer agrees to repair or replace asphalt shingles that fail within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Manufacturing defects.

b. Failure of asphalt shingles to self-seal after a reasonable time.

2. Materials Warranty Period: 50 years from date of Substantial Completion, prorated, with first 10 years non-prorated.

3. Wind-Speed Warranty Period: Asphalt shingles will resist blow-off or damage caused by wind speeds of up to 110 mph for 10 years from date of Substantial Completion.

4. Algae-Resistance Warranty Period: Asphalt shingles will not discolor for 30 years from date of Substantial Completion.

5. Workmanship Warranty Period: 20 years from date of Substantial Completion.

B. Roofing Installer's Warranty: On warranty form at end of this Section, signed by Installer, in which Installer agrees to repair or replace components of asphalt shingle roofing that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 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: ASTM D3462/D3462M, laminated, multi-ply overlay construction; glass-fiber reinforced, mineral-granule surfaced, and self-sealing.

1. Basis of design:

a. CertainTeed Landmark Pro or better in Landmark series.

2. Butt Edge: Straight cut.
3. Strip Size: Manufacturer's standard.
4. Algae Resistance: Granules 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. Basis of design:

a. CertainTeed RoofRunner (for Asphalt Shingles)

B. Self-Adhering, Polymer-Modified Bitumen Sheet: ASTM D1970/D1970M, minimum 40-mil thick sheet; glass-fiber-mat-reinforced, polymer-modified asphalt; with slip-resistant top surface and release backing; cold applied. Provide primer for adjoining concrete, masonry, and metal surfaces to receive underlayment.

1. Basis of design:

a. CertainTeed Grace Vycor Ice & Water Shield (for Asphalt Shingles)

2. Top Surface: Textured polyethylene film.

2.5 RIDGE VENTS

A. Rigid Ridge Vent: Manufacturer's standard, rigid-section, high-density, UV-stabilized plastic ridge vent for use under ridge shingles.

1. Basis of design:

a. CertainTeed Ridge Vent

2. Minimum Net Free Area: 18 sq inches per lin. ft.

3. Width: 12”.
4. Thickness: 1” +/-.
5. Features:
    a. Nonwoven geotextile filter strips.
    b. External deflector baffles.

2.6 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. Underlayment Nails: Aluminum, stainless steel, or hot-dip galvanized-steel wire nails with low-profile metal or plastic caps, 1-inch-minimum diameter.

1. Provide with minimum 0.0134-inch-thick metal cap, 0.010-inch-thick power-driven metal cap, or 0.035-inch-thick plastic cap; and with minimum 0.083-inch-thick ring shank or 0.091-inch-thick smooth shank of length to penetrate at least 3/4 inch into roof sheathing or to penetrate through roof sheathing less than 3/4 inch thick.

2.7 METAL FLASHING AND TRIM

A. Comply with requirements in Section 07 62 00 "Sheet Metal Flashing and Trim."

1. Sheet Metal: Pre-painted, metallic-coated steel.

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 head lap of 2 inches and a minimum extension of 5 inches over the underlying asphalt shingle and up the vertical surface.

3. Cricket and Backer Flashings: Fabricate with concealed flange extending a minimum of 24 inches beneath upslope asphalt shingles and 6 inches beyond each side of blocking item (chimney, skylight, etc.) and 6 inches above the roof plane.

4. Counterflashings: Fabricate to cover 4 inches of base flashing measured vertically; and in lengths required so that no step exceeds 8 inches and overall length is no more than 10 feet.

a. Provide metal reglets for installation.

5. Open-Valley Flashings: Fabricate from metal sheet not less than 24 inches wide in lengths not exceeding 10 feet, with min. 1-inch high, inverted-V profile water diverter at center of valley and equal flange widths of not less than 11 inches.

   a. Hem flange edges for fastening with metal cleats.
   b. Add stiffening ribs in flashings to promote drainage.

6. 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.

7. Vent-Pipe Flashings: ASTM B749, Type L51121, at least 1/16 inch thick. Provide lead sleeve sized to slip over and turn down into pipe, soldered to skirt at slope of roof, and extending at least 4 inches from pipe onto roof.

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. Asphalt-Saturated Felt: Install on roof deck parallel with and starting at eaves and fasten with underlayment nails per manufacturers best recommendation.

   1. Single-Layer Installation:

      a. Lap sides a minimum of 4 inches over underlying course.
      b. Lap ends a minimum of 4 inches.
      c. Stagger end laps between succeeding courses at least 72 inches.

   2. Double-Layer Installation:

a. Install a 19-inch-wide starter course at eaves and completely cover with a 36-inch-wide second course.
b. Install succeeding 36-inch-wide courses lapping previous courses 19 inches in shingle fashion.
c. Lap ends a minimum of 4 inches. Stagger end laps between succeeding courses at least 72 inches.
d. Apply a continuous layer of asphalt roofing cement over starter course and on felt surface to be concealed by succeeding courses as each felt course is installed. Apply over entire roof unless otherwise noted on drawings.

3. Install felt 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 felt over self-adhering sheet not less than 4 inches in direction that sheds water.
   b. Lap ends of felt not less than 6 inches over self-adhering sheet.
4. Install fasteners in a grid pattern of 12 inches between side laps with 6-inch spacing at side and end laps.
5. Terminate felt extended up not less than 4 inches against sidewalls, curbs, chimneys, and other roof projections.

C. 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.

D. 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 24 inches beyond interior face of exterior wall.
5. Rakes: Extend from edges of rakes 24 inches beyond interior face of exterior wall.
6. Valleys: Extend from lowest to highest point 18 inches on each side of centerline.
7. Hips: Extend 18 inches on each side.
8. Ridges: Extend 36 inches on each side without obstructing continuous ridge vent slot.
9. Sidewalls: Extend 18 inches beyond sidewalls and return vertically against sidewalls not less than 4 inches.
10. Dormers, Chimneys, Skylights, and Other Roof-Penetrating Elements: Extend 18 inches beyond penetrating elements and return vertically against penetrating elements not less than 4 inches.
11. Roof-Slope Transitions: Extend 18 inches on each roof slope.
12. Cover underlayment within seven days.

E. Granular-Surfaced, Concealed Valley Lining: For closed-cut valleys. Comply with recommendations in NRCA's "NRCA Guidelines for Asphalt Shingle Roof Systems."

1. Lap roof-deck underlayment over valley lining at least 6 inches.
2. Install a 36-inch-wide strip of granular-surfaced valley lining, with granular-surface face up, centered in valley and fastened to roof deck.
3. Lap ends of strips at least 12 inches in direction to shed water, and seal with asphalt roofing cement.
4. Fasten to roof deck.

F. Metal-Flashed, Open-Valley Underlayment: Install two layers of minimum 36-inch-wide underlayment centered in valley.

1. Use same underlayment as installed on field of roof.
2. Stagger end laps between layers at least 72 inches.
3. Lap ends of each layer at least 12 inches in direction that sheds water, and seal with asphalt roofing cement.
4. Fasten each layer to roof deck with underlayment nails located as far from valley center as possible and only to extent necessary to hold underlayment in place until installation of valley flashing.
5. Lap roof-deck underlayment over first layer of valley underlayment at least 6 inches.

G. Granular-Surfaced, Open-Valley Lining: Before installing valley lining, install 36-inch-wide felt underlayment centered in valley. Fasten to roof deck with underlayment nails.

1. Lap roof-deck felt underlayment over valley felt underlayment at least 6 inches.
2. Install an 18-inch-wide strip of valley lining centered in valley, with granular-surface face down.
3. Install a second 36-inch-wide strip of valley lining centered in valley, with granular-surface face up.
4. Lap ends of each strip at least 12 inches in direction to shed water, and seal with asphalt roofing cement.
5. Stagger end laps between succeeding strips at least 72 inches.
6. Fasten each strip to roof deck.

3.3 INSTALLATION OF METAL FLASHING AND TRIM

A. Install metal flashings and trim to comply with requirements in Section 07 62 00 "Sheet Metal Flashing and Trim."

1. Install metal flashings in accordance with recommendations in ARMA's "Asphalt Roofing Residential Manual - Design and Application Methods" or NRCA's "NRCA Guidelines for Asphalt Shingle Roof Systems."
2. Bed flanges of metal flashings using asphalt roofing cement or elastomeric flashing sealant.

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 head lap of 2 inches and extend over underlying shingle and up the vertical face.

1. Install with lower edge of flashing just upslope of, and concealed by, butt of overlying shingle.
2. Fasten to roof deck only.

D. Cricket and Backer Flashings: Install against roof-penetrating elements extending concealed flange beneath upslope asphalt shingles and beyond each side.

E. Counterflashings: Coordinate with installation of base flashing and fit tightly to base flashing. Lap joints a minimum of 4 inches secured in a waterproof manner.

1. Install in reglets or receivers.

F. Open-Valley Flashings: Install centered in valleys, lapping ends at least 8 inchesin direction that sheds water. Fasten upper end of each length to roof deck beneath overlap.

1. Secure hemmed flange edges into metal cleats spaced 12 inches apart and fastened to roof deck.
2. Adhere minimum 9-inch-wide strips of self-adhering, polymer-modified bitumen sheet to metal flanges and to underlying self-adhering sheet, polymer-modified bitumen sheet.
    a. Place strips parallel to and over flanges so that they will be just concealed by installed shingles.

3. Provide a closure at the end of the inverted-V profile of the valley metal to minimize water and ice infiltration.

G. Rake Drip Edges: Install over underlayment materials and fasten to roof deck.

H. Eave Drip Edges: Install below underlayment materials and fasten to roof deck.

I. 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 and recommendations in ARMA's "Asphalt Roofing Residential Manual - Design and Application Methods" and NRCA's "NRCA Guidelines for Asphalt Shingle Roof Systems."

B. Install starter strip along lowest roof edge, consisting of an asphalt shingle strip with tabs removed with self-sealing strip face up at roof edge.

1. Extend asphalt shingles 3/4 inch over fasciae at eaves and rakes.
2. Install starter strip along rake 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.
2. Where roof slope exceeds 18:12, hand seal self-sealing asphalt shingles to improve the shingles' positive bond by applying asphalt roofing cement spots between course overlaps after nailing the upper course.
3. Where roof slope is less than 4:12, hand seal self-sealing asphalt shingles to improve the shingles' positive bond by applying asphalt roofing cement spots between course overlaps after nailing the upper course.
4. When ambient temperature during installation is below 50 deg F, hand seal self-sealing asphalt shingles by applying asphalt roofing cement spots between course overlaps after nailing the upper course.

F. Woven Valleys: Extend succeeding asphalt shingle courses from both sides of valley 12 inches beyond center of valley, weaving intersecting shingle-strip courses over each other. Use one-piece shingle strips without joints in valley.

1. Do not nail asphalt shingles within 6 inches of valley center.

G. 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.

H. Open Valleys: Cut and fit asphalt shingles at open valleys, trimming upper concealed corners of shingle strips.

1. Maintain uniform width of exposed open valley from highest to lowest point.
2. Extend shingle a minimum of 4 inches over valley metal.
3. Set valley edge of asphalt shingles in a 3-inch-wide bed of asphalt roofing cement.
4. Do not nail asphalt shingles to metal open-valley flashings.

I. Ridge Vents: Install continuous ridge vents over asphalt shingles in accordance with manufacturer's written instructions. Fasten with roofing nails of sufficient length to penetrate sheathing.

J. 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.

3.5 ROOFING INSTALLER'S WARRANTY

A. WHEREAS _____ of _____, herein called the "Roofing Installer," has performed roofing and associated work ("the work") on the following project:

1. Owner: _____.

2. Owner Address: _____.

3. Building Name/Type: _____.

4. Building Address: _____.

5. Area of the Work: _____.

6. Acceptance Date: _____.

7. Warranty Period: _____.

8. Expiration Date: _____.

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant the work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that, during Warranty Period, Roofing Installer will, at Roofing Installer's own cost and expense, make or cause to be made such repairs to or replacements of the work as are necessary to correct faulty and defective work and as are necessary to maintain the work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to the work and other parts of the building, and to building contents, caused by:

a. Lightning;
b. Peak gust wind speed exceeding 110 mph;
c. Fire;
d. Failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
e. Faulty construction of copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
f. Vapor condensation on bottom of roofing; and
g. Activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When the work has been damaged by any of foregoing causes, Warranty is to be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.

3. Roofing Installer is responsible for damage to the work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of the work.

4. During Warranty Period, if Owner allows alteration of the work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty becomes null and void on date of the alterations, but only to the extent the alterations affect the work covered by this Warranty. If Owner engages Roofing Installer to perform the alterations, Warranty does not become null and void unless Roofing Installer, before starting the alterations, notified Owner in writing, showing reasonable cause for claim, that the alterations would likely damage or deteriorate the work, thereby reasonably justifying a limitation or termination of this Warranty.

5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a use or service more severe than originally specified, this Warranty becomes null and void on date of the change, but only to the extent the change affects the work covered by this Warranty.

6. Owner promptly notifies Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and affords reasonable opportunity for Roofing Installer to inspect the work and to examine evidence of such leaks, defects, or deterioration.

7. This Warranty is recognized to be the only warranty of Roofing Installer on the work and does not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty does not operate to relieve Roofing Installer of responsibility for performance of the work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, 20____.

1. Authorized Signature: _____.

2. Name: _____.

3. Title: _____

END OF SECTION 07 31 13

SECTION 07 42 13.13 - FORMED METAL WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Exposed-fastener, lap-seam metal wall panels.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Meeting: Conduct preinstallation meeting as part of general construction meeting or separately as necessary.
   1. Meet with Owner, Architect, Owner's insurer if applicable, metal panel Installer, metal panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal panels, including installers of doors, windows, and louvers.
   2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   3. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
   4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
   5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affect metal panels.
   6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
   7. Review temporary protection requirements for metal panel assembly during and after installation.
   8. Review of procedures for repair of metal panels damaged after installation.
   9. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.

C. Samples for Initial Selection: For each type of metal panel indicated with factory-applied finishes.
1. Include Samples of trim and accessories involving color selection.

D. Samples for Verification: For each type of exposed finish, prepared on Samples of size indicated below:
1. Metal Panels: 12 inches long by actual panel width. Include fasteners, closures, and other metal panel accessories.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For each product, for tests performed by a qualified testing agency.

C. Field quality-control reports.

D. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal panels to include in maintenance manuals.

1.7 QUALITY ASSURANCE

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

B. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.

B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Retain strippable protective covering on metal panels during installation.

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

B. Field Measurements: Verify locations of structural members and wall opening dimensions by field measurements before metal wall panel fabrication and indicate measurements on Shop Drawings.
   1. Established Dimensions: Where field measurements cannot be made without delaying the Work, either establish framing and opening dimensions and proceed with fabricating metal wall panels without field measurements or allow for field trimming of panels. Coordinate wall construction to ensure that actual building dimensions, locations of structural members, and openings correspond to established dimensions.

1.10 COORDINATION

A. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.11 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including rupturing, cracking, or puncturing.
      b. Deterioration of metals and other materials beyond normal weathering.
   2. Warranty Period: Two years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 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. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:
   1. Wind Loads: As indicated on Drawings.
   2. Wind Speed: 115 mph (Ultimate).
   3. Exposure Category: B
   4. FEMA Risk Category 3
   5. Deflection Limits: For wind loads, no greater than 1/180 of the span.

B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E283 at the following test-pressure difference:
   1. Test-Pressure Difference: 6.24 lbf/sq. ft**.**

C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E331 at the following test-pressure difference:
   1. Test-Pressure Difference: 6.24 lbf/sq. ft.

D. 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.

E. Fire-Resistance Ratings (for rated assemblies only): Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 EXPOSED-FASTENER, LAP-SEAM METAL WALL PANELS

A. Provide factory-formed metal panels designed to be field assembled by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps. Include accessories required for weathertight installation.

B. Corrugated-Profile, Exposed-Fastener Metal Wall Panels: Formed with alternating curved ribs spaced at 2 - 3 inches o.c. across width of panel.
   1. Basis-of-Design Product: AEP Span Nu-Wave.
   2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A653/A653M, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A792/A792M, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755/A755M.

a. Nominal Thickness: As indicated on drawings or, at minimum, 0.034 inch thick.
b. Exterior Finish: Minimum Three-coat Fluoropolymer
c. Color: As selected by Architect from manufacturer's full range.

3. Rib Spacing: Per item as indicated on drawings.
4. Panel Coverage: Per item as indicated on drawings.
5. Panel Height: Per item as indicated on drawings.

2.3 MISCELLANEOUS MATERIALS

A. Miscellaneous Metal Subframing and Furring: ASTM C645, cold-formed, metallic-coated steel sheet, ASTM A653/A653M, G90 coating designation or ASTM A792/A792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.

B. Panel 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 rakes, 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.

C. 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, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.

D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

E. 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.

2.4 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. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.

C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

D. 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.

E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
   1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
   2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
   3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
   4. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
   5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
   6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
      a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.5 FINISHES

A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other

components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Steel Panels and Accessories:
   1. Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
   1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.
   2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.
      a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. 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

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. Steel Panels: Use stainless steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.

C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

D. Lap-Seam Metal Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.
1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.
2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
5. Flash and seal panels with weather closures at perimeter of all openings.

E. Watertight Installation:
1. Apply a continuous ribbon of sealant or tape to seal lapped joints of metal panels, using sealant or tape as recommend by manufacturer on side laps of nesting-type panels; and elsewhere as needed to make panels watertight.
2. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
3. 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 wall panel manufacturer; or, if not indicated, provide types recommended by metal panel manufacturer.

G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.
   1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof 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 waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.4 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 42 13.13

SECTION 07 46 46 - FIBER-CEMENT SIDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Fiber-cement lap siding.
   2. Fiber-cement panel siding.
   3. Fiber-cement trim.
   4. Fiber-cement soffit.

B. Related Requirements:
   1. Section 06 10 00 "Rough Carpentry" for wood furring, grounds, nailers and blocking.
   2. Section 06 20 13 "Exterior Finish Carpentry" for exterior trim.

1.3 COORDINATION

A. Coordinate siding installation with flashings and other adjoining construction to ensure proper sequencing.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Meeting: Preinstallation meeting may be part of general construction meeting or may be separate as is necessary as determined by architect.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Samples for Initial Selection: For fiber-cement panel, lap siding and soffit including related accessories.

C. Samples for Verification: For each type, color, texture, and pattern required.
   1. 12-inch-long-by-actual-width Sample of siding.
   2. 24-inch-wide-by-24-inch-high Sample panel of siding assembled on plywood backing.
   3. 12-inch-long-by-actual-width Sample of soffit.

4. 12-inch-long-by-actual-width Samples of trim and accessories.

1.6 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of fiber-cement panel, lap siding and soffit.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for fiber-cement siding.

C. Research/Evaluation Reports: For each type of fiber-cement siding required, from ICC-ES.

D. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of product, including related accessories, to include in maintenance manuals.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Furnish full lengths of fiber-cement panel, lap siding and soffit including related accessories, in a quantity equal to 2 percent of amount installed.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with labels intact until time of use.

B. Store materials on elevated platforms, under cover, and in a dry location.

1.10 WARRANTY

A. Warranty: Manufacturer agrees to repair or replace defective materials or refund the purchase price of nonconforming product installed in accordance with manufacturer's written instructions within specified warranty period.
1. Warranty Period for Fiber-Cement Materials: 30 years from date of Substantial Completion.

B. Factory-Applied Finish Warranty: Manufacturer agrees to repair finish or replace materials of deteriorated factory-applied finishes within specified warranty period.
1. Finish Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain products, including related accessories, from single source from single manufacturer.

2.2 FIBER-CEMENT LAP SIDING

A. General: ASTM C1186, Type A, Grade II, fiber-cement board, noncombustible when tested in accordance with ASTM E136; with a flame-spread index of 25 or less when tested in accordance with ASTM E84.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide James Hardie Building Products Inc.; HardiePlank Lap Siding or comparable product by one of the following:
      a. CertainTeed Corporation.
      b. GAF.
      c. Nichiha Fiber Cement

B. Labeling: Provide fiber-cement siding that is tested and labeled in accordance with ASTM C1186 by a qualified testing agency acceptable to authorities having jurisdiction.

C. Nominal Thickness: Not less than 5/16 inch.

D. Width: Boards width and bead style as indicated on plans.
   1. Texture: as indicated on plans.

E. Length: Minimum 12 ft.

F. Factory Priming: Manufacturer's standard acrylic primer.

G. Factory Finish: Manufacturer's standard multicoat, heat-cured acrylic paint.
   1. Colors: As selected by Architect from manufacturer's full range.

2.3 FIBER-CEMENT PANEL SIDING

A. General: ASTM C1186, Type A, Grade II, fiber-cement board, noncombustible when tested in accordance with ASTM E136; with a flame-spread index of 25 or less when tested in accordance with ASTM E84.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide James Hardie Building Products Inc.; HardiePanel Vertical Siding or comparable product by one of the following:
      a. CertainTeed Corporation.
      b. GAF.
      c. Nichiha Fiber Cement

B. Labeling: Provide fiber-cement siding that is tested and labeled in accordance with ASTM C1186 by a qualified testing agency acceptable to authorities having jurisdiction.

C. Nominal Thickness: Not less than 5/16 inch.

D. Panel Texture: 48-inch-wide sheets with texture as indicated on drawings.
   1. Pattern: Groove spacing as indicated on drawings

E. Factory Priming: Manufacturer's standard acrylic primer.

F. Factory Finish: Manufacturer's standard multicoat, heat-cured acrylic paint.
   1. Colors: As selected by Architect from manufacturer's full range.

2.4 FIBER-CEMENT TRIM

A. General: ASTM C1186, Type A, Grade II, fiber-cement board; with a flame-spread index of 25 or less when tested in accordance with ASTM E84.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide James Hardie Building Products Inc.; HardieTrim as indicated on drawings or comparable product by one of the following:
      a. CertainTeed Corporation.
      b. GAF.
      c. Nichiha Fiber Cement

B. Labeling: Provide fiber-cement siding that is tested and labeled in accordance with ASTM C1186 by a qualified testing agency acceptable to authorities having jurisdiction.

C. Actual Size: Board width as indicated on drawings.

D. Texture: as indicated on drawings.

E. Length: Minimum 12 ft..

F. Factory Priming: Manufacturer's standard acrylic primer.

G. Factory Finish: Manufacturer's standard multicoat, heat-cured acrylic paint.

2.5 FIBER-CEMENT PANEL RAINSCREEN SYSTEM AND ACCESSORIES

A. General: Rainscreen system comprised of fiber-cement panels, furring, and weather barrier.

B. Fiber Cement Panels: ASTM C1186, Type A, Grade II, fiber-cement board, noncombustible when tested in accordance with ASTM E136; with a flame-spread index of 25 or less when tested in accordance with ASTM E84.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide James Hardie Building Products Inc.; Hardie Reveal Panel or comparable product by one of the following:
      a. CertainTeed Corporation.
      b. Nichiha Fiber Cement.
   2. Labeling: Provide fiber-cement siding that is tested and labeled in accordance with ASTM C1186 by a qualified testing agency acceptable to authorities having jurisdiction.

3. Thickness: Minimum 7/16 inch.
4. Size: 47-1/2 by 95-1/2 inches panels.
5. Factory Priming: Manufacturer's standard acrylic primer.
6. Factory Finish: Manufacturer's standard multicoat, heat-cured acrylic paint.
    a. Colors: As selected by Architect from manufacturer's full range.

C. Water-Resistive Barrier: Provide vapor-permeable, water-resistive barrier in accordance with ICC-ES AC38, ASTM E2178, and manufacturer's written instructions.
1. Basis-of-Design Product: Subject to compliance with requirements, James Hardie Building Products Inc.; HardieWrap or comparable product by one of the following:
    a. DuPont de Nemours, Inc.
    b. Kingspan Insulation Limited.
2. Thickness: Minimum 11 mils.
3. Permeance Rating: Maximum 15 perm when tested in accordance with ASTM E96/E96M.

D. Aluminum Trim: Manufacturer's standard aluminum Alloy 6063-T5 complying with Project requirements.
1. Finish: Anodized unless otherwise indicated in the drawings.
2. Thickness: Minimum 0.05 inches.
3. Lengths: Minimum 8 ft..

E. Wood Subframing and Furring: Provide pressure-treated wood framing members as required for support and alignment of fiber cement panel system in accordance with manufacturer’s written instructions.
1. Nominal Size: Not less than 1 by 3 inches.
2. Spacing: Not less than 24 inches or as indicated on the drawings

F. Metal Subframing and Furring: Provide ASTM C645, cold-formed, metallic-coated steel as required for support and alignment of fiber cement panel system in accordance with manufacturer's written instructions.

2.6 FIBER-CEMENT SOFFIT

A. General: ASTM C1186, Type A, Grade II, fiber-cement board, noncombustible when tested in accordance with ASTM E136; with a flame-spread index of 25 or less when tested in accordance with ASTM E84.
1. Basis-of-Design Product: Subject to compliance with requirements, provide James Hardie Building Products Inc.; HardieSoffit Panels or comparable product by one of the following:
    a. CertainTeed Corporation.
    b. Nichiha Fiber Cement.

B. Nominal Thickness: Not less than 1/4 inch.

C. Pattern: as indicated on drawings

D. Ventilation: Provide perforated or unperforated soffit as indicated on drawings.

E. Factory Priming: Manufacturer's standard acrylic primer.

F. Factory Finish: Manufacturer's standard multicoat, heat-cured acrylic paint.
   1. Colors: As selected by Architect from manufacturer's full range.

2.7 ACCESSORIES

A. Siding Accessories, General: Provide starter strips, edge trim, outside and inside corner caps, and other items as recommended by siding manufacturer for building configuration.
   1. Provide accessories matching color and texture of adjacent siding unless otherwise indicated.

B. Decorative Accessories: Provide the following fiber-cement decorative accessories as indicated:
   1. Corner posts.
   2. Door and window casings.
   3. Fasciae.
   4. Moldings and trim.

C. Flashing: Provide flashing as indicated on drawings complying with Section 07 62 00 "Sheet Metal Flashing and Trim" at window and door heads and where indicated.

D. Fasteners:
   1. For fastening to wood, use siding nails or ribbed bugle-head screws as indicated on drawings in accordance with manufacturer's written instructions and authorities having jurisdiction.
   2. For fastening to metal, use ribbed bugle-head screws in accordance with manufacturer's written instructions and authorities having jurisdiction.
   3. For fastening fiber cement, use hot-dip galvanized or stainless steel fasteners.

E. Insect Screening for Soffit Vents: Aluminum, 18-by-16 mesh or PVC-coated, glass-fiber fabric, 18-by-14 mesh or Stainless steel, 18-by-18 mesh.

F. Continuous Soffit Vents: Aluminum, hat-channel shape, with stamped louvers or perforations; 2 inches wide and not less than 96 inches long.
   1. Net-Free Area: Minimum 8 sq. in./linear ft. or as indicated on drawings.
   2. Finish: as indicated on drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of fiber-cement panel, lap siding and soffit and related accessories.

B. 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

A. General: Comply with manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.
   1. Do not install damaged components.
   2. Install fasteners no more than 24 inches or as indicated on drawings.

B. Install fiber cement panel, lap siding and soffit 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. Leave gap at perimeter, openings, and horizontal joints unless otherwise recommended by manufacturer.
   6. Seal butt joints at inside and outside corners and at trim locations.
   7. Apply battens and corner trim as indicated on Drawings.
   8. Coordinate exterior finish carpentry with materials and systems in or adjacent to it.
   9. Provide cutouts for mechanical and electrical items that penetrate exterior finish carpentry.
   10. Conceal fasteners to greatest practical extent by placing in grooves of siding pattern or by concealing with applied trim or battens as detailed.

C. Install joint sealants as specified in Section 07 92 00 "Joint Sealants" and to produce a weathertight installation.

3.4 INSTALLATION OF FIBER CEMENT TRIM

A. General: Comply with manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.
   1. Do not install damaged components.
   2. Install fasteners no more than 24 inches or as indicated on drawings.

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 ADJUSTING AND CLEANING

A. Remove damaged, improperly installed, or otherwise defective materials and replace with new materials complying with specified requirements.

B. Clean finished surfaces in accordance with manufacturer's written instructions and maintain in a clean condition during construction.

END OF SECTION 07 46 46

PART 1 - PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Two-ply modified bituminous membrane roofing with mineral surface.
2. Vapor retarder.
3. Roof Insulation.
4. Temporary roof membrane.
5. Walk pads.

B. Related Sections include the following:

1. Division 06 10 00 Section "Rough Carpentry" for wood blocking, curbs, cants, and nailers; and wood-based, structural-use roof deck panels.
2. Division 07 62 00 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counterflashings.

1.3 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D 1079 for definitions of terms related to roofing work not otherwise defined in this Section.

B. Hot Roofing Asphalt: Roofing asphalt heated to its equiviscous temperature, the temperature at which its viscosity is 125 centipoise for mop-applied roofing asphalt and 75 centipoise for mechanical spreader-applied roofing asphalt within a range of plus or minus 25 deg F measured at the mop cart or mechanical spreader immediately before application.

1.4 SUBMITTALS

A. Product Data: For each type of roofing product specified. Include data substantiating that materials comply with requirements.

B. Samples for Verification: Of the following products:

1. 12-by-12-inch square of modified bituminous, granule-surfaced cap sheets, of color specified.
2. 12-by-12-inch square of metal-foil-surfaced, modified bituminous cap sheets.
3. 12-by-12-inch square of roofing insulation.
4. 6 insulation fasteners of each type, length, and finish.

C. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install specified roofing system and is eligible to receive the standard roofing manufacturer's warranty.

D. Letter of Compatibility: Written statement from the manufacturer of the roofing membrane stating that all proposed materials used are compatible with the specified

product and do not invalidate or in any way lessen the required warranties. The letter shall also state that all Contract Drawing details and specifications meet the manufacturer's requirements for the required warranties. Provide two (2) copies of letter to the Architect prior to award of roofing work.

E. Product Test Reports: Based on evaluation of tests performed by manufacturer and witnessed by a qualified independent testing agency, indicate compliance of components of roofing system with requirements based on comprehensive testing of current product compositions.

1. Indicate compliance of bulk roofing asphalt materials delivered to Project with requirements. Include quantity and statistical and descriptive data for each product. Submit certificate with each load before it is used.

F. Warranty: Sample copy of standard roofing manufacturer's warranty stating obligations, remedies, limitations, and exclusions of warranty.

G. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roof installation.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer to perform Work of this Section who has specialized in installing roofing similar to that required for this Project; who is approved, authorized, or licensed by the roofing system manufacturer to install manufacturer's product; and who is eligible to receive the standard roofing manufacturer's warranty.

1. Installer's Field Supervision: Require installer to maintain a full-time supervisor/foreman who is on the jobsite during times that roofing work is in progress and who is experienced in installation of roofing systems similar to type and scope required for this Project.

B. Manufacturer Qualifications: Obtain primary products, including each type of roofing sheet (felt), bitumen, flashings, and vapor retarder (if any) from a single manufacturer. Provide secondary products as recommended by manufacturer of primary products for use with roofing system specified.

C. Insurance Certification: Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

D. UL Listing: Provide roofing system and component materials that have been tested for application and slopes indicated and are listed by UL in "Building Materials Directory", or by other nationally recognized testing laboratory for Class B external fire exposure.

1. Provide roof-covering materials bearing UL Classification Marking (or corresponding marking from other nationally recognized testing laboratory) on bundle, package, or container indicating that materials have been produced under UL's Classification and Follow-Up Service, or corresponding system.

E. FM Listing: Provide roofing system and component materials that have been evaluated by Factory Mutual System for wind uplift and are listed in "Factory Mutual Approval Guide" for Class I construction.

1. Provide roofing system that can be installed to comply with FM requirements for "I 90" wind uplift requirements.

2. Provide roof covering materials bearing FM approval marking on bundle, package, or container indicating that material has been subjected to FM's examination and follow-up inspection service.

F. Fire Performance Characteristics: Provide insulation materials that are identical to materials whose fire performance characteristics, per requirements listed in Part 2 of this Section, have been determined by testing by UL or other nationally recognized testing and inspecting agency acceptable to authorities having jurisdiction, when tested for the assemblies of which the insulation materials are a part and in accordance with approved test methods.

G. Preinstallation Conference: Before installing roofing system, conduct conference at Project site to comply with requirements of Division 01 Section "Project Meetings." Notify participants at least 5 working days before conference.

1. Meet with Owner; Architect; Owner's insurer, if applicable; testing and inspecting agency representative; roofing Installer; roofing system manufacturer's representative; deck Installer; and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and attachment to structural members.
4. Review loading limitations of deck during and after roofing.
5. Review flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing.
6. Review governing regulations and requirements for insurance, certifications, and inspection and testing, if applicable.
7. Review temporary protection requirements for roofing system during and after installation.
8. Review roof observation and repair procedures after roofing installation.

1.6 PROJECT CONDITIONS

A. Weather Condition Limitations: Proceed with roofing work only when existing and forecast weather conditions will permit work to be performed in accordance with manufacturers' recommendations and warranty requirements.

B. In the event weather conditions force the rapid closure of exposed roof insulation, the insulation shall be covered with the specified base sheet application and the base sheet coated with asphalt sufficient to prevent water from penetrating the base sheet.

1. Exposed Roof Insulation: The insulation shall be covered with the specified base sheet application and the base sheet coated with asphalt sufficient to prevent water from penetrating the base sheet.
2. Exposed Roof Deck: The deck shall be covered with the specified vapor retarder ply sheet, nailed and coated with asphalt sufficient to prevent water from penetrating the ply sheet.
3. Should the Work be required to be shut down for extended periods of time, adequate closures shall be provided for all installations in place.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store roofing materials in a dry, well-ventilated, weathertight location to ensure no significant moisture pickup and maintain at a temperature exceeding roofing system manufacturer's written instructions. Store rolls of felt and other sheet materials on end on pallets or other raised surfaces. Do not double-stack rolls.

1. Handle and store roofing materials and place equipment in a manner to avoid significant or permanent damage to deck or structural supporting members.

B. Do not leave unused felts and other sheet materials on the roof overnight or when roofing work is not in progress unless protected from weather and moisture and unless maintained at a temperature exceeding 50 deg F.

C. Deliver and store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer.

D. Protect roofing insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with roofing work only when existing and forecasted weather conditions permit roofing to be installed according to manufacturers' written instructions and warranty requirements.

1.9 WARRANTY

A. General Warranty: The warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Standard Roofing Manufacturer's Warranty: Submit a written warranty, without monetary limitation, signed by roofing system manufacturer agreeing to promptly repair leaks in the roof membrane and base flashings resulting from defects in materials or workmanship for the following warranty period:

1. Warranty Period: 10 years.

PART 2 - PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. SBS-Modified Bituminous Sheet:

a. Soprema Roofing and Waterproofing, Inc., Specification #2542
b. Siplast, Inc. - “Paradiene 20/30FR” Specification #2030 IH-A

2. Polyisocyanurate Board Insulation:

a. Paratherm by Siplast

b. Sopra-Iso by Soprema

3. Perlite Board Insulation:

a. GAF Building Materials Corp.
b. Schuller Roofing Systems.

2.2 ROOF MEMBRANE

A. Soprema, Specification No. 2542.

1. Roof Membrane:

a. Base Sheet: “Elastophene Sanded.”
b. Cap Sheet: “Elastophene FR Granules.”

2. Base Flashings:

a. Reinforcing Ply: “Sopralene Flam 180.”
b. Base Flashing: “Sopralenet 250 FR GR.”

B. Siplast, “Paradiene 20/30 FR,” Specification No. 2030 IH-A.

1. Roof Membrane:

a. Base Sheet: “Paradiene 20.”
b. Cap Sheet: “Paradiene 30 FR.” Color shall be “white.”

2. Base Flashings:

a. Reinforcing Ply: “Irex.”
b. Base Flashing: “Parafor 30 TG.”

2.3 AUXILIARY MEMBRANE MATERIALS

A. General: Furnish auxiliary materials recommended by roofing system manufacturer for intended use and compatible with SBS-modified bituminous roofing.

1. Furnish liquid-type auxiliary materials that meet VOC limits of authorities having jurisdiction.

B. Rosin Sheet.

1. Salinas Valley Wax Paper Co., “Red Rosin,” 5 lb. rosin sized sheathing paper or approved equal.

C. Vapor Retarder Ply Sheet.

D. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Soprema, “SOPRAVAP’R.”
b. Siplast, equal.

E. Cricket Insulation.

1. Johns-Manville, “Tapered Fesco Board,” tapered perlite insulation, 48” x 48” x 1/2”/ft. boards or approved equal. Minimum edge thickness shall be one-quarter inch (1/4”).
2. Tapered insulation used must be an insulation approved by the membrane manufacturer. See Paragraph 1.4, D, Letter of Compatibility; Section 07500: “Roofing Membrane.”

F. Cant Material.

1. Johns-Manville, “FesCant Plus” or approved equal cant strip, 1-1/2” x 48” with 4” face and comer cut-outs.

G. Asphalt.

1. Trumbull, Crysen or approved equal. Comply with ASTM D 312, Type IV, Extra Steep. Follow manufacturer’s recommendations regarding EVT temperatures for application. Do not apply roofing materials unless proper asphalt application temperatures can be maintained.

H. Primer.

1. Approved Products:

a. Soprema, “Elastocol 500.”
b. Siplast, “PA-1125 Primer.”

I. Plastic Cement.

1. Soprema, “SBS Modified Plastic Cement.
2. Siplast, “PA-1021 Plastic Cement.”

J. Adhesive.

1. Approved Products:

a. Soprema, “FMA Adhesive.”
b. Siplast, “PA-311 Adhesive.”

K. Sealant.

L. Roofing Membrane to Sheet Metal or Lead: Bostik, “Chem-Calk 300” with required primer or approved equal. Color as selected by Architect. Use with backing-rod as required.

M. Backing Rod” Bostik, “Chem-Rod/Open” or approved equal.

N. Walkpad.

1. Approved Products:
a. Soprema, “Soprawalk.”
b. Siplast, “Paratread.”

O. Fasteners.

1. General: Metal plates, caps, battens, accessory components, fastening devices and adhesives to suit substrate and as recommended by membrane manufacturer unless specifically mentioned below.
2. Sealing Washers: Rawlplug Company, Inc., “Rawl EPDM Sealing Washer,” 5/8” diameter.
3. Base Sheet or Base Flashing to Wood Nailer or Blocking: Simplex Nails, Inc., “12 ga. Simplex” or approved equal. Length as required.
4. Wood Curbs to Wood Decking: Rawlplug Company, Inc., “Rawl Deck Screw #2618” or approved equal.

2.4 INSULATION MATERIALS

A. General: Provide preformed, roofing insulation boards that comply with requirements, selected from manufacturer's standard sizes and of thicknesses indicated.

1. Provide preformed, tapered insulation boards where indicated for sloping to drain. Fabricate with the following taper:
   a. As indicated on Drawings.
2. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

B. Polyisocyanurate Board Insulation: Rigid, cellular polyisocyanurate thermal insulation with core formed by using HCFCs as blowing agents complying with ASTM C 1289. Furnish in 2 layers having a total thickness sufficient to provide an average aged thermal value of R-38. Apply insulation in 4'x4' panels into asphalt.

C. Cellulosic-Fiber-Board Insulation: Fibrous-felted, rigid insulation boards of wood fiber or other cellulosic-fiber and water-resistant binders, asphalt impregnated, chemically treated for deterioration, complying with ASTM C 208, Type II, Grade 2. Apply insulation in 2'x3' panels into asphalt.

2.5 INSULATION ACCESSORIES

A. General: Furnish roofing insulation accessories recommended by insulation manufacturer for intended use and compatible with sheet roofing material.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions of FM 4470, designed for fastening roofing insulation to substrate, tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.

C. Cover Board: Rigid, cellulosic-fiber insulation board, complying with ASTM C 208, Type II, Grade 2, 3/4 inch thick.

D. Substrate Joint Tape: 6 or 8 inches wide, coated, glass-fiber joint tape.

PART 3 - PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions under which roofing will be applied, with Installer present, for compliance with requirements.

B. Verify that roof openings and penetrations are in place and set and braced and that roof drains are properly clamped into position.

C. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at roof penetrations and terminations and match the thicknesses of insulation required.

D. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch out of plane.

E. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrate of dust, debris, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Review the drawings and other sections of the specifications for items of demolition which shall occur prior to installation of new roof membrane.

1. Remove all demolition items from roof, prepare roof drains and broom clean all surfaces before commencing installation.

2. Coordinate the installation of insulation, roofing, flashing, coating, and surfacing so that insulation and felts are not exposed to precipitation or exposed overnight. Provide cut offs at end of each day's work to cover exposed felts and insulation. Provide temporary covering of 2 plies of No. 15 roofing felt set in full moppings of hot bitumen with joints and edges sealed with roofing cement. Remove cut offs immediately before resuming work.

3. Asphalt Bitumen Heating: Heat and apply bitumen in accordance with equiviscous temperature method ("EVT Method") as recommended by NRCA. Do not raise temperature above minimum normal fluid-holding temperature necessary to attain EVT (plus 5 deg. F or 14 deg. C, at point of application) more than one hour prior to time of application. Discard bitumen that has been held at temperature, exceeding finished blowing temperature (FBT) for a period exceeding 3 hours. Determine flash point, finished blowing temperature and EVT or bitumen, either by information from bitumen producer or by suitable tests, and determine maximum fire-safe handling temperature and do not exceed that temperature in heating bitumen; but in no case heat bitumen to a temperature higher than 25 deg. F (14 deg. C) below flash point. Keep kettle lid closed except when adding bitumen.

B. Bitumen Mopping Weights: For interply mopping and for other moppings except as otherwise indicated, apply bitumen at the rate of 25 pounds of asphalt (plus or minus 25 percent on a total-job average basis) per roof square (100 sq. ft.) between plies.

C. Hot Adhesive Application Rates: For interply application and for all applications except as otherwise indicated, apply adhesive in a smooth, even, continuous layer without breaks or voids at the rate of 22 pounds per roof square (100 sq. ft.) between plies. (The porosity of some substrates may require a heavier application to ensure full adhesion.)

D. Substrate Joint Penetrations: Do not allow bitumen to penetrate substrate joints and enter building or damage insulation, vapor barriers (retarders), or other construction. Where mopping is applied directly to a substrate, tape joints or in the case of steep asphalt, hold mopping back 2 inches from both sides of each joint.

3.04 VAPOR RETARDER

A. Over roof sheathing and/or decking on all roofs, install a new vapor retarder using the following method:

B. Self adhere Sopravap'R or equal to clean, dry metal deck. The width of the membrane should be designed to fit perfectly between sections.

C. Install subsequent rolls of membrane in the same way, taking care to overlap the longitudinal joints by 3 inches. End laps shall be 6 inches.

3.05 CRICKET INSTALLATION

A. General: Comply with insulation manufacturer's instructions and recommendations for the handling, installation, and bonding or anchorage of insulation to substrate.

B. Install new tapered insulation crickets, as shown on drawings to create a positive slope to existing drains. Lay in solid mopping of asphalt, applied within temperature range of EVT plus or minus 25 deg. F (14 deg. C) and at rate of 25 pounds (plus or minus 25 percent on total-job basis) per 100 sq. ft. as required by FM for Windstorm Resistance Classification I-90.

C. Butt panels together and tight to vertical surfaces. Cut out around projections.

3.06 CANT INSTALLATION

A. Install fiberboard cants and tapered edge strips in hot asphalt around equipment curbs, roof sidewalls and all other locations shown on drawings.

3.07 ROOF MEMBRANE INSTALLATION

A. General: The following information shows the basic installation sequence. The Installer shall resolve any discrepancies between this information and the manufacturer's specification prior to the commencement of the Work.

B. Base Sheet: Solidly mop to cover board so the flow of water is over or parallel to the laps. Lap each sheet 3 inches on sides and ends. Extend to top of cant at all sidewalls and equipment curbs, and 3" beyond roof edge at roof perimeter. Apply asphalt at the rate of 25 lbs. per square plus surface glaze coating.

a. Install reinforcing strips. Solidly mop to base sheet with 3 inch laps onto itself and 4 inch laps onto horizontal surfaces. Apply asphalt at the rate of 25 pounds per square.

b. Install lead flashing on all vent pipe penetrations through roof. Prime flange and set in roofing cement. Apply reinforcing collar in hot asphalt. Bend top of lead flashing down inside pipe. Apply sealant around base.

c. Cap Sheet: Adhere to base sheet with 3" side laps and 6" end laps. The laps shall be applied so the flow of water is over or parallel to the laps. Adjoining end laps should be offset 3' apart. The sheets shall be cut into 12 foot lengths and allowed to relax before application. Extend to top of cant at perimeter and at all equipment curbs. The cap sheet shall be adhered to the base sheet with a full coating of hot asphalt applied at the rate of 1½ - 2 gallons per square (100 sq. ft.) as required by FM for Windstorm Resistance Classification I-90. Dress all bleed lines of asphalt with granules.

d. Base Flashing: Install at all roof drains, perimeter curbs, sidewalls and equipment curbs as shown on drawings (and at all penetrations and conditions requiring flashing not shown on drawings). Base flashings shall be installed with a minimum 3" lap to itself and shall extend a minimum of 6" onto the roofing membrane surface beyond the cant and 8" minimum up the curb, parapet or sidewall and extend reinforcing ply over the walls where possible. All flashing sheets shall be cut off the end of the roll and be applied vertically, always lapping the selvage edge. Fully torch all flashing, taking special precautions to provide continuous seal at exposed edges of flashing. Dress all bleed lines of asphalt with reflective emulsion.

e. Install walkpad material. Cut material from roll into 3' x 5' pads and allow to flatten before installation. Prime mineral surface cap sheet below walkpad at the rate of 15 lbs. per square and allow to thoroughly dry. Apply in plastic cement or torch apply per manufacturer's requirements.

f. Install sheet metal gutters, copings, reglets, curb covers and counterflashings as noted on drawings and as specified in Section 07 62 00: "Sheet Metal Flashing and Trim."

g. Apply walk pads in plastic roof cement.

3.08 INSULATION INSTALLATION

A Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with roofing system manufacturer's written instructions for installing roofing insulation.

C. Install tapered insulation under area of roofing to conform to slopes indicated and to Shop Drawings.

a. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

D. Install one or more layers of insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2 inches or greater, install required thickness in 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.

a. Nailer Strips: Where roof slopes are greater than 1/2 inch per 12 inches, mechanically fasten to deck 4-inch nominal wide, wood nailer strips of same thickness as insulation, spaced not more than 20 to 21 feet apart. Run nailers perpendicular to slope of roof.

E. Install insulation with long joints of insulation in continuous straight lines with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.

1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

F. Attached Insulation: Install each layer of insulation and secure to deck using asphalt.

1. Fasten insulation according to requirements of FM's "Approval Guide" for specified Windstorm Resistance Classification and the insulation and roofing system manufacturers' written instructions.

G. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Loosely butt cover boards together and fasten to roof deck according to roofing system manufacturer’s written instructions.

3.09 FIELD QUALITY CONTROL

A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.

1. Notify Architect and Owner 48 hours in advance of the date and time of inspection.

3.10 PROTECTING AND CLEANING

A. Protect modified bituminous membrane roofing from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove modified bituminous roofing that does not comply with requirements, repair substrates, reinstall roofing, and repair base flashings to a condition free of damage and deterioration at the time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

D. Remove all construction and roofing debris from roof and gutters. Leave roof “broom clean.”

END OF SECTION 07 52 16

SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Manufactured reglets with counterflashing if indicated.
2. Formed roof-drainage sheet metal fabrications.
3. Formed low-slope roof sheet metal fabrications.
4. Formed steep-slope roof sheet metal fabrications.
5. Formed wall sheet metal fabrications.
6. Formed equipment support flashing.

B. Related Requirements:

1. Section 06 10 00 "Rough Carpentry" for wood nailers, curbs, and blocking.
2. Section 07 42 13.13 "Formed Metal Wall Panels" for sheet metal flashing and trim integral with metal wall panels.
3. Section 07 46 46 " Fiber-Cement Siding " for sheet metal flashing and trim integral with fiber cement wall panels.
4. Section 07 52 16 " SBS Modified Bituminous Membrane Roofing" for materials and installation of sheet metal flashing and trim integral with roofing.
5. Section 07 72 00 "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.

1.3 COORDINATION

A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.

B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Meeting: Conduct preinstallation meeting as part of general construction meeting or separately as necessary.

1. Review construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.
3. Review requirements for insurance and certificates if applicable.
4. Review sheet metal flashing observation and repair procedures after flashing installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each of the following

1. Underlayment materials.
2. Elastomeric sealant.
3. Butyl sealant.
4. Epoxy seam sealer.

B. Shop Drawings: For sheet metal flashing and trim.

1. Include plans, elevations, sections, and attachment details.
2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled Work.
3. Include identification of material, thickness, weight, and finish for each item and location in Project.
4. Include details for forming, including profiles, shapes, seams, and dimensions.
5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
6. Include details of termination points and assemblies.
7. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
8. Include details of roof-penetration flashing.
9. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, flashings, and counterflashings.
10. Include details of special conditions.
11. Include details of connections to adjoining work.
12. Detail formed flashing and trim at scale that is readable.

C. Samples: For each exposed product and for each color and texture specified, 12 inches long by actual width.

D. Samples for Initial Selection: For each type of sheet metal and accessory indicated with factory-applied finishes.

E. Samples for Verification: For each type of exposed finish.

1. Sheet Metal Flashing: 12 inches long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
2. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 inches long and in required profile. Include fasteners and other exposed accessories.
3. Unit-Type Accessories and Miscellaneous Materials: Full-size Sample.

4. Anodized Aluminum Samples: Samples to show full range to be expected for each color required.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Product Certificates: For each type of coping and roof edge flashing that is ANSI/SPRI/FM 4435/ES-1 tested and FM Approvals approved.

C. Product Test Reports: For each product, for tests performed by a qualified testing agency.

D. Evaluation Reports: For copings and roof edge flashing showing compliance with ANSI/SPRI/FM 4435/ES-1.

E. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

B. Special warranty.

1.8 QUALITY ASSURANCE

A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1. For copings and roof edge flashings that are ANSI/SPRI/FM 4435/ES-1 tested and FM approved, shop shall be listed as able to fabricate required details as tested and approved.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
2. Protect stored sheet metal flashing and trim from contact with water.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.10 WARRANTY

A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
b. Chalking in excess of a No. 8 rating when tested in accordance with 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. Sheet metal flashing and trim assemblies, including cleats, anchors, and fasteners, shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual: Architectural Metal Flashing, Condensation and Air Leakage Control, and Reroofing" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

2.2 SHEET METALS

A. Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

B. Aluminum Sheet: ASTM B209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.

1. As-Milled Finish: One-side bright mill.

2. Factory Prime Coating: Where painting after installation is required, pretreat metal with white or light-colored, factory-applied, baked-on epoxy primer coat; minimum dry film thickness of 0.2 mil.
3. Clear Anodic Finish, Coil Coated: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.
4. Color Anodic Finish, Coil Coated: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.

    a. Color: As selected by Architect from full range of industry colors and color densities.
    b. Color Range: 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.

5. Exposed Coil-Coated Finish:

    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.

6. Color: As selected by Architect from manufacturer's full range.
7. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.

C. Stainless Steel Sheet: ASTM A240/A240M, dead soft, fully annealed; with smooth, flat surface.

1. Finish: ASTM A480/A480M, No. 2B (bright, cold rolled)

    a. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
    b. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

D. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet in accordance with ASTM A653/A653M, G90 coating designation or aluminum-zinc alloy-coated steel sheet in accordance with ASTM A792/A792M, Class AZ50 coating designation, Grade 40; pre-painted by coil-coating process to comply with ASTM A755/A755M.

1. Surface: Smooth, flat (and mill phosphatized for field painting where indicated and with manufacturer's standard clear acrylic coating on both sides.
2. Exposed Coil-Coated Finish:

    a. Two-Coat Fluoropolymer: AAMA 621. 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

3. Color: As selected by Architect from manufacturer's full range.
4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.

E. Lead Sheet: ASTM B749 lead sheet.

2.3 UNDERLAYMENT MATERIALS

A. Felt: ASTM D226**/**D226M, Type II (No. 30), asphalt-saturated organic felt; nonperforated.

B. Synthetic Underlayment: Laminated or reinforced, woven polyethylene or polypropylene, synthetic roofing underlayment; bitumen free; slip resistant; suitable for high temperatures over 220 deg F; and complying with physical requirements of ASTM D226/D226M for Type I and Type II felts.

1. Source Limitations: Obtain underlayment from single source from single manufacturer.

C. Self-Adhering, High-Temperature Sheet Underlayment: Minimum 30 mils thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer in accordance with underlayment manufacturer's written instructions.

1. Source Limitations: Obtain underlayment from single source from single manufacturer.
2. Low-Temperature Flexibility: ASTM D1970/D1970M; passes after testing at minus 20 deg F or lower.

D. Slip Sheet: Rosin-sized building paper, 3 lb. /100 sq. ft. minimum.

2.4 MISCELLANEOUS MATERIALS

A. Provide materials and types of fasteners**,** solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing

washers under heads of exposed fasteners bearing on weather side of metal.

b. Blind Fasteners: High-strength aluminum or stainless steel rivets suitable for metal being fastened.

c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.

3. Fasteners for Stainless Steel Sheet: Series 300 stainless steel.

4. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel in accordance with ASTM A153/A153M or ASTM F2329.

C. Solder:

1. For Stainless Steel: ASTM B32, Grade Sn96, with acid flux of type recommended by stainless steel sheet manufacturer.

2. For Zinc-Coated (Galvanized) Steel: ASTM B32, Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.

E. Elastomeric Sealant: ASTM C920, elastomeric polyurethane, polysulfide or silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

H. Bituminous Coating: Cold-applied asphalt emulsion in accordance with ASTM D1187/D1187M.

I. Asphalt Roofing Cement: ASTM D4586, asbestos free, of consistency required for application.

J. Reglets: Units of type, material, and profile required, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory-mitered and -welded corners and junctions and with interlocking counterflashing on exterior face, of same metal as reglet.

1. Source Limitations: Obtain reglets from single source from single manufacturer.

2. Material: Minimum Galvanized steel, 0.022 inch thick.

3. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.

4. Stucco Type: Provide with upturned fastening flange and extension leg of length to match thickness of applied finish materials.

5. Concrete Type: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.
6. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.
7. Accessories:
   a. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
   b. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing's lower edge.
8. Finish: With manufacturer's standard color coating.

2.5 FABRICATION, GENERAL

A. Custom fabricate sheet metal flashing and trim to comply with details indicated and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required.

1. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
2. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
3. Verify shapes and dimensions of surfaces to be covered and obtain field measurements for accurate fit before shop fabrication.
4. Form sheet metal flashing and trim to fit substrates without excessive oil-canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
5. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances:

1. Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
2. Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified.

C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal in accordance with cited sheet metal standard to provide for proper installation of elastomeric sealant.

E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.

G. Seams:

1. Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
2. Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.
3. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.

H. Do not use graphite pencils to mark metal surfaces.

2.6 ROOF-DRAINAGE SHEET METAL FABRICATIONS

A. Hanging Gutters:

1. Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required.
2. Fabricate in minimum 96-inch-long sections.
3. Furnish flat-stock gutter brackets and flat-stock gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard, but with thickness not less than twice the gutter thickness.
4. Fabricate expansion joints, expansion-joint covers, gutter bead reinforcing bars, and gutter accessories from same metal as gutters.
5. Gutter Profile: As indicated on drawings and in accordance with cited sheet metal standard.
6. Expansion Joints: Lap type or Butt type with cover plate
7. Accessories: Continuous, removable leaf screen with sheet metal frame and hardware cloth screen as indicated on the drawings, Wire-ball downspout strainer as indicated on the drawings and Valley baffles.

8. Gutters with Girth 16 to 20 Inches: Fabricate from the following materials:
   a. Aluminum: As indicated on drawings or, at minimum, 0.040 inch thick.
   b. Stainless Steel: As indicated on drawings or, at minimum, 0.0188 inch thick.
   c. Galvanized Steel: As indicated on drawings or, at minimum, 0.028 inch thick.
   d. Aluminum-Zinc Alloy-Coated Steel: As indicated on drawings or, at minimum, 0.028 inch thick.

9. Gutters with Girth 21 to 25 Inches: Fabricate from the following materials:
   a. Aluminum: As indicated on drawings or, at minimum, 0.050 inch thick.
   b. Stainless Steel: As indicated on drawings or, at minimum, 0.0250 inch thick.
   c. Galvanized Steel: As indicated on drawings or, at minimum, 0.034 inch thick.
   d. Aluminum-Zinc Alloy-Coated Steel: As indicated on drawings or, at minimum, 0.034 inch thick.

B. Downspouts: Fabricate downspouts to shape and dimensions indicated on Drawings, complete with mitered elbows. Furnish with metal hangers as indicated on the drawings.

1. Fabricated Hanger Style: As indicated on the drawings and in accordance with SMACNA's "Architectural Sheet Metal Manual."
2. Manufactured Hanger Style: As indicated on the drawings and in accordance with SMACNA's "Architectural Sheet Metal Manual."
3. Hanger Style: As indicated on drawings.
4. Fabricate from the following materials:

   a. Aluminum: As indicated on drawings or, at minimum, 0.024 inch thick.
   b. Stainless Steel: As indicated on drawings or, at minimum, 0.0156 inch thick.
   c. Galvanized Steel: As indicated on drawings or, at minimum, 0.022 inch thick.
   d. Aluminum-Zinc Alloy-Coated Steel: As indicated on drawings or, at minimum, 0.022 inch thick.

C. Conductor Heads: Fabricate conductor heads with flanged back and stiffened top edge and of dimensions and shape required, complete with outlet tubes, exterior flange trim, and built-in overflows unless otherwise noted on the drawings. Fabricate from the following materials:

1. Aluminum: As indicated on drawings or, at minimum, 0.032 inch thick.
2. Stainless Steel: As indicated on drawings or, at minimum, 0.0156 inch thick.
3. Zinc-Tin Alloy-Coated Copper: 16 oz./sq. ft.
4. Galvanized Steel: As indicated on drawings or, at minimum, 0.028 inch thick.
5. Aluminum-Zinc Alloy-Coated Steel: As indicated on drawings or, at minimum, 0.028 inch thick.
6. Zinc: As indicated on drawings or, at minimum, 0.039 inch thick.

D. Splash Pans: Fabricate to dimensions and shape required and from the following materials:

1. Aluminum: As indicated on drawings or, at minimum, 0.040 inch thick.
2. Stainless Steel: As indicated on drawings or, at minimum, 0.0188 inch thick.
3. Zinc-Tin Alloy-Coated Copper: 16 oz./sq. ft.
4. Zinc: As indicated on drawings or, at minimum, 0.039 inch thick.

2.7 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

A. Roof Edge Flashing (Gravel Stop) and Fascia Cap: Fabricate in minimum 96-inch-long, but not exceeding 12-foot-long sections. Furnish with 6-inch-wide, joint cover plates. Shop fabricate interior and exterior corners.

1. Joint Style: Overlapped, 4 inches wide.
2. Fabricate with scuppers spaced 10 feet apart, to dimensions required with 4-inch-wide flanges and base extending 4 inches beyond cant or tapered strip into field of roof. Fasten gravel guard angles to base of scupper.
3. Fabricate from the following materials:

   a. Aluminum: As indicated on drawings or, at minimum, 0.050 inch thick.
   b. Stainless Steel: As indicated on drawings or, at minimum, 0.0188 inch thick.
   c. Zinc-Tin Alloy-Coated Copper: 20 oz./sq. ft.

d. Galvanized Steel: As indicated on drawings or, at minimum, 0.028 inch thick.
e. Aluminum-Zinc Alloy-Coated Steel: As indicated on drawings or, at minimum, 0.028 inch thick.
f. Zinc: As indicated on drawings or, at minimum, 0.059 inch thick.

B. Copings: Fabricate in minimum 96-inch-long, but not exceeding 12-foot-long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners, fasten and seal watertight. Shop fabricate interior and exterior corners.

1. Coping Profile: As indicated on drawings and in accordance with SMACNA's "Architectural Sheet Metal Manual."
2. Joint Style: Butted with expansion space and 6-inch-wide, exposed cover plate unless otherwise indicated on drawings.
3. Fabricate from the following materials:

a. Aluminum: As indicated on drawings or, at minimum, 0.050 inch thick.
b. Stainless Steel: As indicated on drawings or, at minimum, 0.0250 thick.
c. Zinc-Tin Alloy-Coated Copper: 24 oz./sq. ft.
d. Galvanized Steel: As indicated on drawings or, at minimum, 0.040 inch thick.
e. Aluminum-Zinc Alloy-Coated Steel: As indicated on drawings or, at minimum, 0.040 inch thick.
f. Zinc: As indicated on drawings or, at minimum, 0.059 inch thick.

C. Roof and Roof-to-Wall Transition, Roof-to-Roof Edge-Flashing (Gravel-Stop) Transition, Roof-to-Roof Edge-Flashing (Gravel-Stop) and Fascia-Cap Transition, Expansion-Joint Cover: Shop fabricate interior and exterior corners. Fabricate from the following materials:

1. Aluminum: As indicated on drawings or, at minimum, 0.050 inch thick.
2. Stainless Steel: As indicated on drawings or, at minimum, 0.0250 inch thick.
3. Zinc-Tin Alloy-Coated Copper: 16 oz./sq. ft.
4. Galvanized Steel: As indicated on drawings or, at minimum, 0.034 inch thick.
5. Aluminum-Zinc Alloy-Coated Steel: As indicated on drawings or, at minimum, 0.034 inch thick.
6. Zinc: As indicated on drawings or, at minimum, 0.039 inch thick.

D. Base Flashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:

1. Aluminum: As indicated on drawings or, at minimum, 0.040 inch thick.
2. Stainless Steel: As indicated on drawings or, at minimum, 0.0188 inch thick.
3. Zinc-Tin Alloy-Coated Copper: 20 oz./sq. ft.
4. Galvanized Steel: As indicated on drawings or, at minimum, 0.028 inch thick.
5. Aluminum-Zinc Alloy-Coated Steel: As indicated on drawings or, at minimum, 0.028 inch thick.
6. Zinc: As indicated on drawings or, at minimum, 0.039 inch thick.

E. Counterflashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:

1. Aluminum: As indicated on drawings or, at minimum, 0.032 inch thick.

2. Stainless Steel: As indicated on drawings or, at minimum, 0.0188 inch thick.
3. Zinc-Tin Alloy-Coated Copper: 16 oz./sq. ft.
4. Galvanized Steel: As indicated on drawings or, at minimum, 0.022 inch thick.
5. Aluminum-Zinc Alloy-Coated Steel: As indicated on drawings or, at minimum, 0.022 inch thick.
6. Zinc: As indicated on drawings or, at minimum, 0.039 inch thick.

F. Flashing Receivers: Fabricate from the following materials:

1. Aluminum: As indicated on drawings or, at minimum, 0.032 inch thick.
2. Stainless Steel: As indicated on drawings or, at minimum, 0.0156 inch thick.
3. Zinc-Tin Alloy-Coated Copper: 16 oz./sq. ft.
4. Galvanized Steel: As indicated on drawings or, at minimum, 0.022 inch thick.
5. Aluminum-Zinc Alloy-Coated Steel: As indicated on drawings or, at minimum, 0.022 inch thick.
6. Zinc: As indicated on drawings or, at minimum, 0.039 inch thick.

G. Roof-Penetration Flashing: Fabricate from the following materials:

1. Stainless Steel: As indicated on drawings or, at minimum, 0.0188 inch thick.
2. Zinc-Tin Alloy-Coated Copper: 16 oz./sq. ft.
3. Galvanized Steel: As indicated on drawings or, at minimum, 0.028 inch thick.
4. Aluminum-Zinc Alloy-Coated Steel: As indicated on drawings or, at minimum, 0.028 inch thick.
5. Zinc: As indicated on drawings or, at minimum, 0.039 inch thick.
6. Lead: As indicated on drawings or, at minimum, 4 lb.

H. Roof-Drain Flashing: Fabricate from the following materials:

1. Stainless Steel: As indicated on drawings or, at minimum, 0.0156 inch thick.

2.8 STEEP-SLOPE ROOF SHEET METAL FABRICATIONS

A. Apron, Step, Cricket, and Backer Flashing: Fabricate from the following materials:

1. Aluminum: As indicated on drawings or, at minimum, 0.032 inch thick.
2. Stainless Steel: As indicated on drawings or, at minimum, 0.0156 inch thick.
3. Zinc-Tin Alloy-Coated Copper: 16 oz./sq. ft.
4. Galvanized Steel: As indicated on drawings or, at minimum, 0.022 inch thick.
5. Aluminum-Zinc Alloy-Coated Steel: As indicated on drawings or, at minimum, 0.022 inch thick.
6. Zinc: As indicated on drawings or, at minimum, 0.039 inch thick.

B. Valley Flashing: Fabricate from the following materials:

1. Stainless Steel: As indicated on drawings or, at minimum, 0.0188 inch thick.
2. Zinc-Tin Alloy-Coated Copper: 16 oz./sq. ft.
3. Galvanized Steel: As indicated on drawings or, at minimum, 0.028 inch thick.
4. Aluminum-Zinc Alloy-Coated Steel: As indicated on drawings or, at minimum, 0.028 inch thick.
5. Zinc: As indicated on drawings or, at minimum, 0.039 inch thick.

C. Drip Edges: Fabricate from the following materials:

1. Aluminum: As indicated on drawings or, at minimum, 0.032 inch thick.
2. Stainless Steel: As indicated on drawings or, at minimum, 0.0156 inch thick.
3. Zinc-Tin Alloy-Coated Copper: 16 oz./sq. ft.
4. Galvanized Steel: As indicated on drawings or, at minimum, 0.022 inch thick.
5. Aluminum-Zinc Alloy-Coated Steel: As indicated on drawings or, at minimum, 0.022 inch thick.
6. Zinc: As indicated on drawings or, at minimum, 0.039 inch thick.

D. Eave, Rake, Ridge, and Hip Flashing: Fabricate from the following materials:

1. Aluminum: As indicated on drawings or, at minimum, 0.032 inch thick.
2. Stainless Steel: As indicated on drawings or, at minimum, 0.0156 inch thick.
3. Zinc-Tin Alloy-Coated Copper: 16 oz./sq. ft.
4. Galvanized Steel: As indicated on drawings or, at minimum, 0.022 inch thick.
5. Aluminum-Zinc Alloy-Coated Steel: As indicated on drawings or, at minimum, 0.022 inch thick.
6. Zinc: As indicated on drawings or, at minimum, 0.039 inch thick.

E. Counterflashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:

1. Aluminum: As indicated on drawings or, at minimum, 0.032 inch thick.
2. Stainless Steel: As indicated on drawings or, at minimum, 0.0188 inch thick.
3. Zinc-Tin Alloy-Coated Copper: 16 oz./sq. ft.
4. Galvanized Steel: As indicated on drawings or, at minimum, 0.022 inch thick.
5. Aluminum-Zinc Alloy-Coated Steel: As indicated on drawings or, at minimum, 0.022 inch thick.
6. Zinc: As indicated on drawings or, at minimum, 0.039 inch thick.

F. Flashing Receivers: Fabricate from the following materials:

1. Aluminum: As indicated on drawings or, at minimum, 0.032 inch thick.
2. Stainless Steel: As indicated on drawings or, at minimum, 0.0156 inch thick.
3. Zinc-Tin Alloy-Coated Copper: 16 oz./sq. ft.
4. Galvanized Steel: As indicated on drawings or, at minimum, 0.022 inch thick.
5. Aluminum-Zinc Alloy-Coated Steel: As indicated on drawings or, at minimum, 0.022 inch thick.
6. Zinc: As indicated on drawings or, at minimum, 0.039 inch thick.

G. Roof-Penetration Flashing: Fabricate from the following materials:

1. Stainless Steel: As indicated on drawings or, at minimum, 0.0188 inch thick.
2. Zinc-Tin Alloy-Coated Copper: 16 oz./sq. ft.
3. Galvanized Steel: As indicated on drawings or, at minimum, 0.028 inch thick.
4. Aluminum-Zinc Alloy-Coated Steel: As indicated on drawings or, at minimum, 0.028 inch thick.
5. Zinc: As indicated on drawings or, at minimum, 0.039 inch thick.
6. Copper-Clad Stainless Steel: 0.018 inch thick.
7. Lead: As indicated on drawings or, at minimum, 4 lb.

2.9 WALL SHEET METAL FABRICATIONS

A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch-long, but not exceeding 12-foot-long, sections, under copings, and at shelf angles. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches beyond each side of wall openings; and form with 2-inch-high, end dams. Fabricate from the following materials:

1. Stainless Steel: As indicated on drawings or, at minimum, 0.0156 inch thick.
2. Zinc-Tin Alloy-Coated Copper: 16 oz./sq. ft.
3. Zinc: As indicated on drawings or, at minimum, 0.039 inch thick.

B. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings unless otherwise indicated on drawings. Form head and sill flashing with 2-inch-high, end dams. Fabricate from the following materials:

1. Aluminum: As indicated on drawings or, at minimum, 0.032 inch thick.
2. Stainless Steel: As indicated on drawings or, at minimum, 0.0156 inch thick.
3. Zinc-Tin Alloy-Coated Copper: 16 oz./sq. ft.
4. Galvanized Steel: As indicated on drawings or, at minimum, 0.022 inch thick.
5. Aluminum-Zinc Alloy-Coated Steel: As indicated on drawings or, at minimum, 0.022 inch thick.
6. Zinc: As indicated on drawings or, at minimum, 0.039 inch thick.

C. Wall Expansion-Joint Cover: Fabricate from the following materials:

1. Aluminum: As indicated on drawings or, at minimum, 0.040 inch thick.
2. Stainless Steel: As indicated on drawings or, at minimum, 0.0188 inch thick.
3. Zinc-Tin Alloy-Coated Copper: 16 oz./sq. ft.
4. Galvanized Steel: As indicated on drawings or, at minimum, 0.028 inch thick.
5. Aluminum-Zinc Alloy-Coated Steel: As indicated on drawings or, at minimum, 0.028 inch thick.
6. Zinc: As indicated on drawings or, at minimum, 0.039 inch thick.

2.10 MISCELLANEOUS SHEET METAL FABRICATIONS

A. Equipment Support Flashing: Fabricate from the following materials:

1. Stainless Steel: As indicated on drawings or, at minimum, 0.0188 inch thick.
2. Zinc-Tin Alloy-Coated Copper: 16 oz./sq. ft.
3. Galvanized Steel: As indicated on drawings or, at minimum, 0.028 inch thick.
4. Aluminum-Zinc Alloy-Coated Steel: As indicated on drawings or, at minimum, 0.028 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF UNDERLAYMENT

A. Felt Underlayment: Install felt underlayment, wrinkle free, using adhesive to minimize use of mechanical fasteners under sheet metal flashing and trim.

1. Install in shingle fashion to shed water.
2. Lap joints not less than 2 inches.

B. Synthetic Underlayment: Install synthetic underlayment, wrinkle free, in accordance with manufacturers' written instructions, and using adhesive where possible to minimize use of mechanical fasteners under sheet metal.

1. Lap horizontal joints not less than 4 inches.
2. Lap end joints not less than 12 inches.

C. Self-Adhering, High-Temperature Sheet Underlayment:

1. Install self-adhering, high-temperature sheet underlayment; wrinkle free.
2. Prime substrate if recommended by underlayment manufacturer.
3. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures.
4. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses.
5. Overlap side edges not less than 3-1/2 inches. Roll laps and edges with roller.
6. Roll laps and edges with roller.
7. Cover underlayment within 14 days.

D. Install slip sheet, wrinkle free, over underlayment or directly on substrate as indicated on the drawings before installing sheet metal flashing and trim.

1. Install in shingle fashion to shed water.
2. Lapp joints not less than 4 inches.

3.3 INSTALLATION, GENERAL

A. Install sheet metal flashing and trim to comply with details indicated and recommendations of cited sheet metal standard that apply to installation characteristics required unless otherwise indicated on Drawings.

1. Install fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
2. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds or sealant seams.
3. Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement.
4. Install sheet metal flashing and trim to fit substrates and to result in watertight performance.
5. Install continuous cleats with fasteners spaced not more than 12 inches o.c.
6. Space individual cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
7. Install exposed sheet metal flashing and trim with limited oil-canning, and free of buckling and tool marks.
8. Do not field cut sheet metal flashing and trim by torch.
9. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Coat concealed side of uncoated-aluminum and stainless steel] sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim.

1. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
2. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
3. Use lapped expansion joints only where indicated on Drawings.

D. Fasteners: Use fastener 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 or substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Seal joints as required for watertight construction.

1. Use sealant-filled joints unless otherwise indicated.

    a. Embed hooked flanges of joint members not less than 1 inch into sealant.
    b. Form joints to completely conceal sealant.
    c. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way.
    d. Adjust setting proportionately for installation at higher ambient temperatures.

        1) Do not install sealant-type joints at temperatures below 40 deg F.

2. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 "Joint Sealants."

G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter.

1. Pretin edges of sheets with solder to width of 1-1/2 inches; however, reduce pretinning where pretinned surface would show in completed Work.
2. Do not solder metallic-coated steel and aluminum sheet.
3. Do not pretin zinc-tin alloy-coated copper.
4. Do not use torches for soldering.
5. Heat surfaces to receive solder, and flow solder into joint.

    a. Fill joint completely.
    b. Completely remove flux and spatter from exposed surfaces.

6. Stainless Steel Soldering:

    a. Tin edges of uncoated sheets, using solder for stainless steel and acid flux.
    b. Promptly remove acid-flux residue from metal after tinning and soldering.
    c. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

7. Copper Soldering: Tin edges of uncoated sheets, using solder for copper.
8. Copper-Clad Stainless Steel Soldering: Tin edges of uncoated sheets, using solder for copper-clad stainless steel.

H. Rivets: Rivet joints in zinc where necessary for strength.

3.4 INSTALLATION OF ROOF-DRAINAGE SYSTEM

A. Install sheet metal roof-drainage items to produce complete roof-drainage system in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

B. Hanging Gutters:

1. Join sections with riveted and soldered joints or joints sealed with sealant as indicated on the drawings.
2. Provide for thermal expansion.
3. Attach gutters at eave or fascia to firmly anchor them in position.

4. Provide end closures and seal watertight with sealant.
5. Slope to downspouts.
6. Fasten gutter spacers to front and back of gutter.
7. Anchor and loosely lock back edge of gutter to continuous cleat, eave or apron flashing as indicated on the drawings.
8. Anchor back of gutter that extends onto roof deck with cleats spaced not more than 24 inches apart unless otherwise indicated on the drawings.
9. Anchor gutter with gutter brackets or straps spaced not more than 24 inches apart to roof deck unless otherwise indicated, and loosely lock to front gutter bead.
10. Anchor gutter with spikes and ferrules spaced not more than 24 inches apart unless otherwise indicated on the drawings.
11. Install gutter with expansion joints at locations indicated on Drawings, but not exceeding, 50 feet apart. Install expansion-joint caps.
12. Install continuous gutter screens on gutters with noncorrosive fasteners, removable for cleaning gutters.

C. Downspouts:

1. Join sections with 1-1/2-inch telescoping joints.
2. Provide hangers with fasteners designed to hold downspouts securely to walls.
3. Locate hangers at top and bottom and at approximately 60 inches o.c.
4. Provide elbows at base of downspout to direct water away from building.
5. Connect downspouts to underground drainage system.

D. Splash Pans:

1. Install where downspouts discharge on low-slope roofs.
2. Set in asphalt roofing cement or elastomeric sealant compatible with the substrate.

E. Parapet Scuppers:

1. Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.
2. Anchor scupper closure trim flange to exterior wall and solder or seal with elastomeric sealant to scupper.
3. Loosely lock front edge of scupper with conductor head.
4. Solder or seal with elastomeric sealant exterior wall scupper flanges into back of conductor head.

F. Conductor Heads: Anchor securely to wall, with elevation of conductor head rim at minimum of 1 inch below scupper or gutter discharge.

G. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated on Drawings. Lap joints minimum of 4 inches in direction of water flow.

3.5 INSTALLATION OF ROOF FLASHINGS

A. Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard.

1. Provide concealed fasteners where possible, and set units true to line, levels, and slopes.
2. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Roof Edge Flashing:

1. Install roof edge flashings in accordance with ANSI/SPRI/FM 4435/ES-1.
2. Anchor to resist uplift and outward forces in accordance with recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.
3. Anchor to resist uplift and outward forces in accordance with recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.

C. Copings:

1. Install roof edge flashings in accordance with ANSI/SPRI/FM 4435/ES-1.
2. Anchor to resist uplift and outward forces in accordance with recommendations in cited sheet metal standard unless otherwise indicated.

    a. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate as indicated on drawings or, at minimum, at 24-inch centers.
    b. Anchor interior leg of coping with washers and screw fasteners through slotted holes as indicated on drawings or, at minimum, at 24-inch centers.

3. Anchor to resist uplift and outward forces in accordance with recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for specified FM Approvals' listing for required windstorm classification.

D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches over base flashing. Install stainless steel draw band and tighten.

E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing.

1. Insert counterflashing in reglets or receivers and fit tightly to base flashing.
2. Extend counterflashing 4 inches over base flashing.
3. Lap counterflashing joints minimum of 4 inches.
4. Secure in waterproof manner by means as indicated on drawings or, at minimum, provide a snap-in installation and sealant or lead wedges and sealant.

F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.6 INSTALLATION OF WALL FLASHINGS

A. Install sheet metal wall flashing to intercept and exclude penetrating moisture in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings unless otherwise indicated on drawings.

C. Reglets: Additional information for installation of reglets can be found in Section 03 30 00 "Cast-in-Place Concrete".

3.7 INSTALLATION OF MISCELLANEOUS FLASHING

A. Equipment Support Flashing:

1. Coordinate installation of equipment support flashing with installation of roofing and equipment.
2. Weld or seal flashing with elastomeric sealant to equipment support member.

B. Overhead-Piping Safety Pans:

1. Suspend pans from structure above, independent of other overhead items such as equipment, piping, and conduit, unless otherwise indicated on Drawings.
2. Pipe and install drain line to plumbing waste or drainage system.

3.8 INSTALLATION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.9 CLEANING

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

3.10 PROTECTION

A. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.

B. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended in writing by sheet metal flashing and trim manufacturer.

C. Maintain sheet metal flashing and trim in clean condition during construction.

D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures, as determined by Architect.

END OF SECTION 07 62 00

SECTION 07 72 00 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Preformed flashing sleeves.

B. Related Requirements:
   1. Section 07 62 00 "Sheet Metal Flashing and Trim" for shop- and field-formed metal flashing, roof-drainage systems, roof expansion-joint covers, and miscellaneous sheet metal trim and accessories.
   2. Section 07 72 53 "Snow Guards" for snow guards.

1.3 COORDINATION

A. Coordinate layout and installation of roof accessories with roofing membrane, base flashing and/or interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.

B. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of roof accessory.

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

B. Shop Drawings: For roof accessories.

   1. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.

C. Samples: For each exposed product and for each color and texture specified, prepared on Samples of size to adequately show color.

D. Delegated-Design Submittal: For roof curbs, equipment supports and walkways indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Detail mounting, securing, and flashing of roof-mounted items to roof structure. Indicate coordinating requirements with roof membrane system.
2. Wind-Restraint Details: Detail fabrication and attachment of wind restraints. Show anchorage details and indicate quantity, diameter, and depth of penetration of anchors.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:

1. Size and location of roof accessories specified in this Section.
2. Method of attaching roof accessories to roof or building structure.
3. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.
4. Required clearances.

B. Sample Warranties: For manufacturer's special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For roof accessories to include in operation and maintenance manuals.

1.7 WARRANTY

A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finishes or replace roof accessories that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 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 accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

B. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design roof curbs and equipment supports to comply with wind performance requirements, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

C. Wind-Restraint Performance: Per local code requirements and as indicated per structural engineer.

2.2 PREFORMED FLASHING SLEEVES

A. Exhaust Vent Flashing: Double-walled metal flashing sleeve or boot, insulation filled, with integral deck flange, 12 inches high, with removable metal hood and slotted metal collar.

1. Metal: Aluminum sheet, 0.063 inch thick.
2. Diameter: As indicated on Drawings.
3. Finish: Manufacturer's standard.

B. Vent Stack Flashing: Metal flashing sleeve, uninsulated, with integral deck flange.

1. Metal: Aluminum sheet, 0.063 inch thick.
2. Height: 7 inches.
3. Diameter: As indicated on Drawings.
4. Finish: Manufacturer's standard.

2.3 METAL MATERIALS

A. Aluminum Extrusions and Tubes: ASTM B221, manufacturer's standard alloy and temper for type of use, finished to match assembly where used; otherwise mill finished.

2.4 MISCELLANEOUS MATERIALS

A. Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.

B. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

C. Underlayment:

1. Felt: ASTM D226/D226M, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
2. Polyethylene Sheet: 6-mil-thick polyethylene sheet complying with ASTM D4397.
3. Slip Sheet: Building paper, 3 lb./100 sq. ft. minimum, rosin sized.
4. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.

D. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:
1. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.

E. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.

F. Elastomeric Sealant: ASTM C920, elastomeric polymer sealant as recommended by roof accessory manufacturer for installation indicated; low modulus; of type, grade, class, and use classifications required to seal joints and remain watertight.

G. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for expansion joints with limited movement.

H. Asphalt Roofing Cement: ASTM D4586/D4586M, asbestos free, of consistency required for application.

2.5 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.

B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

C. Verify dimensions of roof openings for roof accessories.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install roof accessories according to manufacturer's written instructions.

1. Install roof accessories level; plumb; true to line and elevation; and without warping, jogs in alignment, buckling, or tool marks.
2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.

B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

1. Coat concealed side of uncoated aluminum roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of underlayment and cover with manufacturer's recommended slip sheet.
3. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof accessories for waterproof performance.

C. Preformed Flashing-Sleeve and Flashing Pipe Portal Installation: Secure flashing sleeve to roof membrane according to flashing-sleeve manufacturer's written instructions; flash sleeve flange to surrounding roof membrane according to roof membrane manufacturer's instructions.

3.3 REPAIR AND CLEANING

A. Touch up factory-primed surfaces with compatible primer ready for field painting according to Section 09 91 13 "Exterior Painting."

B. Clean exposed surfaces according to manufacturer's written instructions.

C. Clean off excess sealants.

D. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 07 72 00

SECTION 07 72 53 - SNOW GUARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Rail-type, flat-mounted snow guards.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product, include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Include roof plans showing layouts and attachment details of snow guards.

   1. Include details of rail-type snow guards.

C. Samples:

   1. Rail-Type Snow Guards: Bracket and 12-inch-long rail.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each type of snow guard, for tests performed by a qualified testing agency, indicating point of failure of attachment to roof system identical as that used on this Project.

1.5 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit adhesive-mounted snow guards to be installed according to adhesive manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Performance Requirements: Provide snow guards that withstand exposure to weather and resist thermally induced movement without failure, rattling, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

B. Structural Performance: Snow guards shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.

1. Snow Loads: As indicated on Drawings.

2.2 RAIL-TYPE SNOW GUARDS

A. Flat-Mounted, Rail-Type Snow Guards:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

a. Alpine SnowGuards, a division of Vermont Slate & Copper Services, Inc.

2. Description: Snow guard rails fabricated from metal pipes, bars, or extrusions, anchored to brackets and equipped with min. 2 rails.
3. Material and Finish: Aluminum; mill finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, snow guard attachment, and other conditions affecting performance of the Work.

1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean and prepare substrates for bonding snow guards.

B. Prime substrates according to snow guard manufacturer's written instructions.

3.3 INSTALLATION

A. Install snow guards according to manufacturer's written instructions.
   1. Space rows as recommended by manufacturer.

B. Attachment for Asphalt Shingle Roofing:

   1. Rail-Type, Flat-Mounted, Snow Guards: Mounting plates bolted or screwed to the roof framing or roof deck.

END OF SECTION 07 72 53

SECTION 07 72 71 - FALL PROTECTION DEVICES

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes: Roof anchor connectors.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM)
B. American National Standard Institute (ANSI)
    a. ANSI Z359.1-2017 – Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components
    b. ANSI Z359.6-2009 – Specifications and Design Requirements for Active Fall Protection Systems
C. Occupational Health And Safety Administration (OSHA)
    a. OSHA 1926.502 – Fall Prevention Systems Criteria and Practices
    b. OSHA 1910 compliant

1.03 SYSTEM DESCRIPTION

A. General: Provide fall protection anchorage capable of withstanding loads and stresses within limits and under conditions specified in OSHA and other applicable safety codes. Anchors shall not penetrate roof.
B. Design Requirements: Anchors and accessories used as basis of design comprising system of following types:
    a. Guardian Pitch Pro #GF-10543 Roof Anchors or equal, spaced as indicated by manufacturer, unless otherwise noted on plans, for safety snap connection by individual workers capable of withstanding a 5,000 pound load or safety factor of 2 meeting the requirements of OSHA 1926.502(d)(8).
C. Performance Requirements: System and components tested for the resistance of the following loads:
    a. Capacity: 1 user – 130 – 420 lbs.
    b. Design fall protection anchors to resist a 5,000 pound load applied in any direction at maximum anchor height or provide engineered system designed meeting the requirements of OSHA 1926.502(d)(8).
    c. Minimum service temperature: -30F.

1.04 SUBMITTALS

A. Product Data: For each type of device specified, including manufacturer’s standard fabrication details and installation instructions.

1.05 QUALITY ASSURANCE

A. OSHA Standards: Comply with Occupational Safety and Health Administration Standards for the Construction Industry 29 CFR § 1926.500 Subpart M (Fall Protection), and with applicable State Administrative Code safety standards for Fall Restraint and Fall Arrest.
B. Source Limitations: Obtain all roof anchors through one source from a single manufacturer.

1.06 COORDINATION

A. Contractor to coordinate installation of structural deck to meet requirements of roof anchor manufacturer.
    a. Contractor to coordinate installation requirements of roof anchor manufacturer with roof specifications and roof manufacturer requirements.
B. Contractor to coordinate installation of structural deck reinforcements and anchorages to receive fall protection anchors. Roofing and associated structural components must be capable of withstanding the design loads.

1.07 WARRANTY

A. Provide manufacturer's standard warranty to guarantee products will be free from defects for a period of 12 months. Warranty period shall become effective on date of substantial completion.

PART 2 – PRODUCTS

2.01 MANUFACTURER

A. Provide fall protection anchors manufactured by Guardian Fall Protection Inc., 6305 South 231st Street Kent, WA, phone 800-466-6385, fax 800-670-7892, or equal.

2.02 MATERIALS

A. Pitch Pro # GF- 10543 roof anchor connector. Powder-coated steel.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine framing and substrate and verify conditions comply with structural requirements for proper system performance.

B. Proceed with installation of roof anchors only after verifying conditions are satisfactory.

3.02 INSTALLATION

A. General: Installation to be performed by contractor according to manufacturer's instructions and recommendations.

3.03 ADJUSTMENT AND INSPECTION

A. Ensure all manufactured anchors have been installed in accordance with fall protection manufacturer's engineering documentation and specifications.
B. Provide plan drawings with any deviations in anchor locations as installed.

END OF SECTION 07 72 71

SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Silicone joint sealants.
2. Non staining silicone joint sealants.
3. Urethane joint sealants.
4. Immersible joint sealants.
5. Silyl-terminated polyether joint sealants.
6. Mildew-resistant joint sealants.
7. Polysulfide joint sealants.
8. Butyl joint sealants.
9. Latex joint sealants.

B. Related Requirements:
1. Section 07 91 00 "Preformed Joint Seals" for preformed compressible foam and precured joint seals.
2. Section 32 13 73 "Concrete Paving Joint Sealants" for sealing joints in paved roads, parking lots, walkways, and curbing.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Meeting: Preinstallation meeting may be part of general construction meeting or may be separate as is necessary as determined by architect.

1.4 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.

1.5 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 or a qualified testing agency.

C. Preconstruction Laboratory Test Schedule: Include the following information for each joint sealant and substrate material to be tested:
   1. Joint-sealant location and designation.
   2. Manufacturer and product name.
   3. Type of substrate material.
   4. Proposed test.
   5. Number of samples required.

D. Preconstruction Laboratory Test Reports: From sealant manufacturer, indicating the following:
   1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
   2. Interpretation of test results and written recommendations for primers and substrate preparation are needed for adhesion.

E. Preconstruction Field-Adhesion-Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.

F. Field-Adhesion-Test Reports: For each sealant application tested.

G. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Product Testing: Test joint sealants using a qualified testing agency.
   1. Testing Agency Qualifications: Qualified according to ASTM C1021 to conduct the testing indicated.

C. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.7 PRECONSTRUCTION TESTING

A. Preconstruction Laboratory Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
   1. Adhesion Testing: Use ASTM C794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
   2. Compatibility Testing: Use ASTM C1087 to determine sealant compatibility when in contact with glazing and gasket materials.
   3. Stain Testing: Use ASTM C1248 to determine stain potential of sealant when in contact with stone, masonry or other applicable substrates.
   4. Submit manufacturer's recommended number of pieces of each type of material, including joint substrates, joint-sealant backings, and miscellaneous materials.
   5. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
   6. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.
   7. Testing will not be required if joint-sealant manufacturers submit data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, staining of, and compatibility with joint substrates and other materials matching those submitted.

B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:
   1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
   2. Conduct field tests for each kind of sealant and joint substrate.
   3. Notify Architect seven days in advance of dates and times when test joints will be erected.
   4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
      a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.
         1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
   5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
   6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of

noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.8 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.

1.9 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty Period: Five years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
   1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
   2. Disintegration of joint substrates from causes exceeding design specifications.
   3. Mechanical damage caused by individuals, tools, or other outside agents.
   4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

A. Silicone, S, NS, 100/50, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Use NT.

B. Silicone, S, NS, 50, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 50, Use NT.

C. Silicone, S, NS, 35, NT: Single-component, nonsag, plus 35 percent and minus 35 percent movement capability. nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 35, Use NT.

D. Silicone, S, NS, 25, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.

E. Silicone, Acid Curing, S, NS, 25, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant: ASTM C920, Type S, Grade NS, Class 25, Use NT.

F. Silicone, S, NS, 100/50, T, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Uses T and NT.

G. Silicone, S, NS, 50, T, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 50, Uses T and NT.

H. Silicone, S, NS, 25, T, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 25, Uses T and NT.

I. Silicone, S, P, 100/50, T, NT: Single-component, pourable, plus 100 percent and minus 50 percent movement capability traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade P, Class 100/50, Uses T and NT.

J. Silicone, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade P, Class 25, Uses T and NT.

K. Silicone, M, P, 100/50, T, NT: Multicomponent, pourable, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type M, Grade P, Class 100/50, Uses T and NT.

2.3 NON-STAINING SILICONE JOINT SEALANTS

A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C1248.

B. Silicone, Nonstaining, S, NS, 100/50, NT: Nonstaining, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Use NT.

C. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 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. Dow Corning Corporation; 795
      b. GE Construction Sealants; SilPruf NB
      c. May National Associates, Inc., a subsidiary of Sika Corporation U.S.; Bondaflex Sil 295 FPS NB.
      d. Sika Corporation, inc
      e. Others only as approved prior to bidding.

D. Silicone, Nonstaining, S, NS, 100/50, T, NT: Nonstaining, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Uses T and NT.

E. Silicone, Nonstaining, M, NS, 50, NT: Nonstaining, multicomponent, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type M, Grade NS, Class 50, Use NT.

2.4 URETHANE JOINT SEALANTS

A. Urethane, S, NS, 25, NT: Single-component, nonsag, nontraffic-use, plus 25 percent and minus 25 percent movement capability, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.

B. Urethane, S, NS, 100/50, T, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Uses T and NT.

C. Urethane, S, NS, 25, T, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 25, Uses T and NT.

D. Urethane, S, P, 35, T, NT: Single-component, pourable, plus 35 percent and minus 35 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade P, Class 35, Uses T and NT.

E. Urethane, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade P, Class 25, Uses T and NT.

F. Urethane, M, NS, 50, NT: Multicomponent, nonsag, plus 50 percent and minus 50 percent movement capability nontraffic-use, urethane joint sealant; ASTM C920, Type M, Grade NS, Class 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. Bostik Inc.
      b. Master Builders / BASF
      c. Pecora Corporation
      d. Sike Corporation, Construction Products Division
      e. Tremco Incorporated.

G. Urethane, M, NS, 25, NT: Multicomponent, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, urethane joint sealant; ASTM C920, Type M, 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. Bostik Inc.
      b. Master Builders / BASF
      c. Pecora Corporation
      d. Sike Corporation, Construction Products Division
      e. Tremco Incorporated.

H. Urethane, M, NS, 50, T, NT: Multicomponent, nonsag, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type M, Grade NS, Class 50, Uses T and NT.

I. Urethane, M, NS, 25, T, NT: Multicomponent, nonsag, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type M, Grade NS, Class 25, 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. Sika Corporation, inc.; Sikaflex-2c NS TG.
      b. Sonneborn, Division of ChemRex Inc.; NP 2.
      c. Tremco; Vulkem 322 DS or Dymeric.
      d. Bostik Findley; Chem-Calk 500.

e. Polymeric Systems Inc.; PSI-270. Inc.

J. Urethane, M, P, 50, T, NT: Multicomponent, pourable, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type M, Grade P, Class 50, Uses T and NT.

K. Urethane, M, P, 25, T, NT: Multicomponent, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type M, Grade P, Class 25, 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. Bostik Findley; Chem-Calk 550.
   b. Pacific Polymers, Inc.; Elasto-Thane 227 High Shore Type I (self leveling).
   c. Pacific Polymers, inc. Elasto-Thane 227 Type I (self leveling).
   d. Pecora Corporation; Urexpan NR-200.
   e. Polymeric Systems, inc.; PSI-270SL.
   f. Tremco; THC-901.
   g. Tremco; THC-900.
   h. Tremco; Vulkem 245.
   i. Pecora Corporation; Urexpan NR 300, Type H.
   j. Pecora Corporation; Urexpan NR 300, Type M..

2.5 IMMERSIBLE JOINT SEALANTS

A. Immersible Joint Sealants. Suitable for immersion in liquids; ASTM C1247, Class 1 or Class 2; tested in deionized water unless otherwise indicated

B. Urethane, Immersible, S, NS, 100/50, NT, I: Immersible, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Uses NT, and I.

C. Urethane, Immersible, S, NS, 35, NT, I: Immersible, single-component, nonsag, plus 35 percent and minus 35 percent movement capability, nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 35, Use NT and I.

D. Urethane, Immersible, S, NS, 50, T, NT, I: Immersible, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 50, Uses T, NT, and I.

E. Urethane, Immersible, S, NS, 35, T, NT, I: Immersible, single-component, nonsag, plus 35 percent and minus 35 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 35, Uses T, NT, and I.

F. Urethane, Immersible, S, NS, 25, T, NT, I: Immersible, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 25, Uses T, NT, and I.

G. Urethane, Immersible, S, P, 50, T, NT, I: Immersible, single-component, pourable, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade P, Class 50, Uses T, NT, and I.

H. Urethane, Immersible, S, P, 25, T, NT, I: Immersible, single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade P, Class 25, Uses T, NT, and I.

I. Polysulfide, Immersible, M, NS, 25, NT, I: Immersible, multicomponent, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, polysulfide joint sealant; ASTM C920, Type M, Grade NS, Class 25, Uses NT and I.

J. Urethane, Immersible, M, NS, 50, T, NT, I: Immersible, multicomponent, nonsag, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type M, Grade NS, Class 50, Uses T, NT, and I.

K. Urethane, Immersible, M, NS, 25, T, NT, I: Immersible, multicomponent, nonsag, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type M, Grade NS, Class 25, Uses T, NT, and I.

L. Polysulfide, Immersible, M, NS, 25, T, NT, I: Immersible, multicomponent, nonsag, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, polysulfide joint sealant; ASTM C920, Type M, Grade NS, Class 25, Uses T, NT, and I.

M. Urethane, Immersible, M, P, 25, T, NT, I: Immersible, multicomponent, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type M, Grade P, Class 25, Uses T, NT, and I.

2.6 SILYL-TERMINATED POLYETHER (STPE) JOINT SEALANTS

A. 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 C920, Type S, Grade NS, Class 50, Use NT.

B. STPE, S, NS, 35, NT: Single-component, nonsag, plus 35 percent and minus 35 percent movement capability, nontraffic-use, silyl-terminated polyether joint sealant; ASTM C920, Type S, Grade NS, Class 35, Use NT.

C. STPE, S, NS, 25, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, silyl-terminated polyether joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.

D. STPE, S, NS, 100/50, T, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, silyl-terminated polyether joint sealant; ASTM C920, Type S, Grade NS, Class 100, Uses T and NT.

E. STPE, S, NS, 50, T, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, silyl-terminated polyether joint sealant; ASTM C920, Type S, Grade NS, Class 50, Uses T and NT.

F. STPE, S, NS, 35, T, NT: Single-component, nonsag, plus 35 percent and minus 35 percent movement capability, traffic- and nontraffic-use, silyl-terminated polyether joint sealant; ASTM C920, Type S, Grade NS, Class 35, Uses T and NT.

G. STPE, S, NS, 25, T, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, silyl-terminated polyether joint sealant; ASTM C920, Type S, Grade NS, Class 25, Uses T and NT.

H. STPE, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, silyl-terminated polyether joint sealant; ASTM C920, Type S, Grade P, Class 25, Uses T and NT.

2.7 MILDEW-RESISTANT JOINT SEALANTS

A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C920, 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. Dow Corning Corporation.
      b. GE Construction Sealants; Momentive Performance Materials Inc.
      c. May National Associates, Inc.; a subsidiary of Sika Corporation.
      d. Momentive Performance Materials.
      e. Tremco Incorporated.
      f. Sika Corporation, inc

C. STPE, Mildew Resistant, S, NS, 50, NT: Mildew-resistant, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, silyl-terminated polyether joint sealant; ASTM C920, Type S, Grade NS, Class 50, Use NT.

2.8 POLYSULFIDE JOINT SEALANTS

A. Polysulfide, S, NS, 25, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, polysulfide joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.

B. Polysulfide, M, NS, 25, T, NT: Multicomponent, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, polysulfide joint sealant; ASTM C920, Type M, Grade NS, Class 25, Use NT.

C. Polysulfide, M, P, 25, T, NT: Multicomponent, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, polysulfide joint sealant; ASTM C920, Type M, Grade P, Class 25, Uses T and NT.

2.9 BUTYL JOINT SEALANTS

A. Butyl-Rubber-Based Joint Sealants: ASTM C1311.
   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. Bostik, Inc.
      b. Dow Corning Corporation.
      c. Tremco Incorporated..

2.10 ACOUSTICAL JOINT SEALANTS

A. Acoustical Joint 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. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Concealed Fire-Rated Acoustical Sealants:
         1) CP 604 Self-leveling Firestop Sealant by Hilti.
         2) Fire Barrier Water Tight Sealant 1003 SL (self-leveling) by 3M Vibration Control.
         3) Nelson Firestop Sealant (CLK).
      b. Paintable Fire-Rated Acoustical Sealants:
         1) “Fire Barrier 2000” by 3M Vibration Control Systems (paintable with special primer).
         2) CP 672 Firestop Joint Spray by Hilti.
         3) CP 606 flexible Firestop Sealant by Hilti.
      c. Concealed Acoustical Sealant
         1) 790 Silicone Building Sealant by Dow Corning
      d. Paintable Acoustical Sealant
         1) Acoustical Sealant by US Gypsum Company
         2) Acoustical Sealant by Tremco
         3) CP 572 Smoke and Acoustics Spray by Hilti.
         4) CP 506 Smoke and Acoustics Sealant by Hilti.

2.11 LATEX JOINT SEALANTS

A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C834, 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.
      b. Bostik, Inc.; Chem-Calk 600.
      c. May National Associates, Inc.; Bondaflex 600 or Bondaflex Sil-A 700.
      d. Pecora Corporation; AC-20+.
      e. Schnee-Morehead, Inc.; SM 8200.
      f. Tremco Incorporated; Tremflex 834.
      g.
   2. Latex Joint Sealants are acceptable at interior locations, except locations where silicone joint sealant or acoustical sealant is required or where in contact with WRB.

2.12 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.
   1. Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Alcot Plastics Ltd.
      b. BASF Corporation; Construction Systems.
      c. Pecora Corporation.

B. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated], and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. 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.

2.13 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable

of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
   1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
   2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
      a. Concrete.
      b. Masonry.
      c. Unglazed surfaces of ceramic tile.
      d. Exterior insulation and finish systems.
   3. Remove laitance and form-release agents from concrete.
   4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
      a. Metal.
      b. Glass.
      c. Porcelain enamel.
      d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM 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.

4. Provide flush joint profile at locations as indicated on Drawings according to Figure 8B in ASTM C1193.
5. Provide recessed joint configuration of recess depth and at locations as indicated on Drawings according to Figure 8C in ASTM C1193.
    a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
1. Extent of Testing: Test completed and cured sealant joints as follows:
    a. Perform 10 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
    b. Perform one test for each 1000 feet of joint length thereafter or one test per each floor per elevation.
2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.
    a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
3. Inspect tested joints and report on the following:
    a. Whether sealants filled joint cavities and are free of voids.
    b. Whether sealant dimensions and configurations comply with specified requirements.
    c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.
4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

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

3.6 PROTECTION

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

3.7 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.
   1. Joint Locations:
      a. Control and expansion joints in brick pavers.
      b. Isolation and contraction joints in cast-in-place concrete slabs.
      c. Joints between plant-precast architectural concrete paving units.
      d. Joints in stone paving units, including steps.
      e. Tile control and expansion joints.
      f. Joints between different materials listed above.
      g. Other joints as indicated on Drawings.
   2. Joint Sealant: Silicone, (Single Component, Pourable, Traffic Grade, Neutral Curing).
   3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

B. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces subject to water immersion.
   1. Joint Locations:
      a. Joints in pedestrian plazas.
      b. Joints in swimming pool decks.
      c. Other joints as indicated on Drawings.
   2. Joint Sealant: Urethane, immersible, S, P, 25, T, NT, I.
   3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

C. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
   1. Joint Locations:
      a. Construction joints in cast-in-place concrete.

b. Joints between plant-precast architectural concrete units.
c. Control and expansion joints in unit masonry.
d. Joints in dimension stone cladding.
e. Joints in glass unit masonry assemblies.
f. Joints in exterior insulation and finish systems.
g. Joints between metal panels.
h. Joints between different materials listed above.
i. Perimeter joints between materials listed above and frames of doors, windows and/or louvers.
j. Control and expansion joints in ceilings, soffits and other overhead surfaces.
k. Other joints as indicated on Drawings.

2. Joint Sealant: Polyurethane, (Non-staining, Single Component, Non-Sag, Neutral Curing, Class 50).
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

D. Joint-Sealant Application: Exterior vertical control and expansion joints in unit masonry.
1. Joint Sealant: Polyurethane, (Non-staining, Single Component, Non-Sag, Neutral Curing).
2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

E. Joint-Sealant Application: Exterior joints in dimension stone cladding.
1. Joint Sealant: Silicone, (Non-staining, Multi-component, Non-Sag, Neutral Curing).
2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

F. Joint-Sealant Application: Exterior butt joints between metal panels
1. Joint Sealant: Silicone, (Non-staining, Single Component, Non-Sag, Neutral Curing).
2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

G. Joint-Sealant Application: Exterior vertical joints between different materials listed above
1. Joint Sealant: Silicone, (Non-staining, Single Component, Non-Sag, Neutral Curing).
2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

H. Joint-Sealant Application: Exterior perimeter joints between and frames of doors, windows, and louvers.
1. Joint Sealant: Silicone, (Non-staining, Single Component, Non-Sag, Neutral Curing).
2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

I. Joint-Sealant Application: Exterior control and expansion joints in overhead surfaces

1. Joint Sealant: Silicone, (Non-staining, Single Component, Non-Sag, Neutral Curing).
2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

J. Joint-Sealant Application: Exterior control and expansion joints in horizontal traffic surfaces of brick pavers.
1. Joint Sealant: Polyurethane, (Multi-component, Non-Sag).
2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

K. Joint-Sealant Application: Vertical control and expansion joints on exposed interior surfaces of exterior walls.
1. Joint Sealant: Silicone, (non-staining, Single Component, Non-Sag, Neutral Curing). Latex (Single Component, Non-Sag).
2. Joint-Sealant Color: Paintable.

L. Joint-Sealant Application: Interior perimeter joints of exterior openings.
1. Joint Sealant: Latex (Single Component, Non-Sag).
2. Joint-Sealant Color: Paintable.

M. Joint-Sealant Application: Interior ceramic tile expansion, control, contraction, and isolation joints in horizontal traffic surfaces.
1. Joint Sealant: Silicone, (Single Component, Sanitary).
2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

N. Joint-Sealant Application: Interior joints between plumbing fixtures and adjoining walls, floors, and counters.
1. Joint Sealant: Silicone, (Non-staining, Single-component, Mildew-Resistant, Neutral Curing).
2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors. Usually white.

O. Joint-Sealant Application: Vertical joints on exposed surfaces of interior unit masonry walls.
1. Joint Sealant: Silicone, (Non-staining, Single Component, Neutral Curing).
2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

P. Joint-Sealant Application: Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.
1. Joint Sealant: Latex (Single Component, Non-Sag).
2. Joint-Sealant Color: paintable

Q. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.
1. Joint Locations:

a. Isolation joints in cast-in-place concrete slabs.
b. Control and expansion joints in stone flooring.
c. Control and expansion joints in brick flooring.
d. Control and expansion joints in tile flooring.
e. Other joints as indicated on Drawings.

2. Joint Sealant: Urethane, (Multicomponent, Non-Sag, Traffic Grade, Class 25).
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

R. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
a. Control and expansion joints on exposed interior surfaces of exterior walls.
b. Perimeter joints of exterior openings where indicated.
c. Tile control and expansion joints.
d. Vertical joints on exposed surfaces of interior unit masonry concrete walls and partitions.
e. Joints on underside of plant-precast structural concrete beams and planks.
f. Perimeter joints between interior wall surfaces and frames of interior doors windows and elevator entrances.
g. Other joints as indicated on Drawings.
2. Joint Sealant: Latex (Single Component, Non-Sag).
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

S. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.
1. Joint Locations:
a. Control joints on exposed interior surfaces of exterior walls.
b. Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.
c. Other joints as indicated on Drawings.
2. Joint Sealant: Acrylic latex.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

T. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
b. Tile control and expansion joints where indicated.
c. Other joints as indicated on Drawings.
2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

U. Joint-Sealant Application: Concealed mastics.

1. Joint Locations:
   a. Aluminum thresholds.
   b. Sill plates.
   c. Other joints as indicated on Drawings.
2. Joint Sealant: Butyl-rubber based.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 07 92 00

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes:

1. Interior steel doors and frames.
2. Exterior steel doors and frames.

B. Related Requirements:

1. Section 08 71 00 "Door Hardware" for door hardware for hollow-metal doors.

1.3 DEFINITIONS

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

1.4 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Meeting: Conduct meeting at project site. Conduct preinstallation meeting as part of general construction meeting or separately as necessary.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, core descriptions, fire-resistance ratings and finishes.

B. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
7. Details of anchorages, joints, field splices, and connections.
8. Details of accessories.
9. Details of moldings, removable stops, and glazing.

C. Samples for Verification:

1. Finishes: For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches.

D. 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.

1.7 CLOSEOUT SUBMITTALS

A. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.8 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. Curries Company; ASSA ABLOY
B. Steelcraft; an Allegion brand

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 and temperature-rise limits 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.
2. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
3. Temperature-Rise Limit: Where indicated on Drawings, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.

B. Fire-Rated, Borrowed-Lite Assemblies: Assemblies complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

C. Thermally Rated Door Assemblies: Provide door assemblies with U-factor as indicated on drawings or, at minimum, not more than 0.38 deg Btu/F x h x sq. ft when tested according to ASTM C518.

2.3 INTERIOR 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. Standard-Duty Doors and Frames: ANSI/SDI A250.8, Level 1; ANSI/SDI A250.4, Level C, at locations indicated in the Door and Frame Schedule.

1. Doors:

a. Type: As indicated in the Door and Frame Schedule.
b. Thickness: As indicated on drawings or, at minimum, 1-3/4 inches.

c. Face: Uncoated steel sheet, minimum thickness of 0.032 inch.
d. Edge Construction: Model 1, Full Flush.
e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
f. Core: Manufacturer's standard with Vertical steel stiffener.
g. Fire-Rated Core: Manufacturer's standard with vertical steel stiffener core for fire-rated and temperature-rise-rated doors.

2. Frames:

a. Materials: Uncoated steel sheet, minimum thickness of 0.042 inch.
b. Sidelite and/or Transom Frames: Fabricated from same thickness material as adjacent door frame.
c. Construction: Full profile welded.

3. Exposed Finish: Prime.

C. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B. At locations indicated in the Door and Frame Schedule.

1. Doors:

a. Type: As indicated in the Door and Frame Schedule.
b. Thickness: As indicated on drawings or, at minimum, 1-3/4 inches.
c. Face: Uncoated steel sheet, minimum thickness of 0.042 inch.
d. Edge Construction: Model 1, Full Flush.
e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
f. Core: Manufacturer's standard with Vertical steel stiffener.
g. Fire-Rated Core: Manufacturer's standard with vertical steel stiffener core for fire-rated and temperature-rise-rated doors.

2. Frames:

a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch.
b. Sidelite and/or Transom Frames: Fabricated from same thickness material as adjacent door frame.
c. Construction: Full profile welded.

3. Exposed Finish: Prime.

2.4 EXTERIOR STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B. At locations indicated in the Door and Frame Schedule.

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 0.042 inch, with minimum A60 coating.
d. Edge Construction: Model 1, Full Flush.
e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
g. Bottom Edges: Close bottom edges of doors with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
h. Core: Manufacturer's standard insulated with vertical steel stiffener.
i. Fire-Rated Core: Manufacturer's standard vertical steel stiffener with insulation core for fire-rated doors.

2. Frames:

a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A60 coating.
b. Construction: Full profile welded.
c. Sidelite and/or Transom Frames: Fabricated from same thickness material as adjacent door frame.

3. Exposed Finish: Prime.

2.5 BORROWED LITES

A. Fabricate of uncoated steel sheet, minimum thickness to match door frame.

B. Construction: Full profile welded.

C. Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as metal as frames.

D. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

2.6 FRAME ANCHORS

A. Jamb Anchors:

1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
2. 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.

3. Post-installed 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. Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at top of underlayment.

D. 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.

2.7 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.

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. Glazing: Comply with requirements in Section 08 80 00 "Glazing."

2.8 FABRICATION

A. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.

B. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide

alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.

1. Sidelite and/or Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding.
2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
3. 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.

4. Terminated Stops (Hospital Stops): Terminate stops 6 inches above finish floor with a 45-degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame.

C. 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 non-templated, mortised, and surface-mounted door hardware.
2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.

D. 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.

2.9 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with 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 non-templated, mortised, and surface-mounted door hardware.

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, NAAMM-HMMA 840.

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 post-installed expansion anchors.

    a. Floor anchors may be set with power-actuated fasteners instead of post-installed expansion anchors if so indicated and approved on Shop Drawings.

4. Solidly pack mineral-fiber insulation inside frames.
5. In-Place Concrete or Masonry Construction: Secure frames in place with post-installed expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
6. 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, NAAMM-HMMA 841 and NAAMM-HMMA guide specification indicated.
2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
3. Smoke-Control Doors: Install doors according to NFPA 105.

D. Glazing: Comply with installation requirements in Section 08 80 00 "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 08 11 13

SECTION 08 14 16 - FLUSH WOOD DOORS

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Five-ply flush wood veneer-faced doors for transparent finish.

B. Related Requirements:
1. Section 08 80 00 "Glazing" for glass view panels in flush wood doors.
2. Section 09 93 00 "Staining and Transparent Finishing" for field finishing doors.

1.3 PREINSTALLATION MEETING

A. Preinstallation Meeting: Conduct meeting at project site. Conduct preinstallation meeting as part of general construction meeting or separately as necessary.

1.4 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. Door louvers.
5. Door trim for openings.
6. Door frame construction.
7. Factory-machining criteria.

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 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 primed and application requirements.

C. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.
2. Polymer edging, in manufacturer's standard colors.
3. Corner sections of doors, approximately 8 by 10 inches, with door faces and edges representing actual materials to be used.

1.5 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Special warranties.

B. Quality Standard Compliance Certificates: Program certificates.

C. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.7 QUALITY ASSURANCE

A. Manufacturer's Certification: Licensed participant in AWI's Quality Certification Program.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting.

C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.9 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.

1.10 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 Exterior Doors: Five years from date of Substantial Completion.
4. Warranty Period for Solid-Core Interior Doors: Life of installation.
5. Warranty Period for Hollow-Core Interior Doors: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain flush wood doors from single manufacturer.

2.2 FLUSH WOOD DOORS, GENERAL

A. Quality Standard: In addition to requirements specified, comply with AWI/AWMAC/WI's "Architectural Woodwork Standards."

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.

2.3 SOLID-CORE FIVE-PLY FLUSH WOOD VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Doors:

1. Performance Grade: ANSI/WDMA I.S. 1A Heavy Duty.
2. Faces: Single-plywood veneer not less than 1/50 inch thick.

a. Species: Select white maple, Red oak.
b. Cut: Rotary cut.
c. Match between Veneer Leaves: Book match.

d. Assembly of Veneer Leaves on Door Faces: Center-balance match.
e. Pair and Set Match: Provide for doors hung in same opening.

3. Exposed Vertical Edges: Same species as faces - 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: 475 lbf in accordance with WDMA T.M. 10.

4. Core for Non-Fire-Rated Doors:

   a. ANSI A208.1, Grade LD-1 particleboard.

      1) Blocking: Provide wood blocking in particleboard-core doors as follows:

         a) 5-inch top-rail blocking, in doors indicated to have closers.
         b) 5-inch bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.

      2) Provide doors with glued-wood-stave cores instead of particleboard cores for doors scheduled to receive exit devices in Section 08 71 00 "Door Hardware".
      3) Screw Withdrawal, Vertical Door Edge 475 lbf.

   b. Either glued wood stave or WDMA I.S. 10 structural composite lumber.

5. 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 follows:

6. Construction: Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.

2.4 LIGHT FRAMES AND LOUVERS

A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.

1. Wood Species: Same species as door faces.
2. Profile: Manufacturer's standard shape.
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.

1. Profile: Flat.

2.5 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.
5. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

C. Transom and Side Panels:

1. Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors.
2. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.
3. Fabricate door and transom panels with full-width, solid-lumber, rabbeted meeting rails.
4. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.

D. Openings: Factory cut and trim openings through doors.

1. Light Openings: Trim openings with moldings of material and profile indicated.

2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 08 80 00 "Glazing."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine, 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 08 71 00 "Door Hardware".

B. Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

C. Install frames level, plumb, true, and straight.

1. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.
2. Anchor frames to anchors or blocking built in or directly attached to substrates.

    a. Secure with countersunk, concealed fasteners and blind nailing.
    b. Use fine finishing nails for exposed fastening, countersunk and filled flush with woodwork.

        1) For factory-finished items, use filler matching finish of items being installed.

3. Install fire-rated doors and frames in accordance with NFPA 80.
4. Install smoke- and draft-control doors in accordance with NFPA 105.

D. Job-Fitted Doors:

1. Align and fit doors in frames with uniform clearances and bevels as indicated below.

    a. Do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors.

2. Machine doors for hardware.
3. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.

4. Clearances:

   a. Provide 1/8 inch at heads, jambs, and between pairs of doors.
   b. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated on Drawings.
   c. Where threshold is shown or scheduled, provide1/4 inch from bottom of door to top of threshold unless otherwise indicated.
   d. Comply with NFPA 80 for fire-rated doors.

5. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
6. Bevel fire-rated doors 1/8 inch in 2 inches at lock edge; trim stiles and rails only to extent permitted by labeling agency.

E. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

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 08 14 16

SECTION 08 51 13 – ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes aluminum windows for exterior locations.

B. Related Requirements:

1. Section 08 80 00 "Glazing" for insulated glass units as part of window assembly

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Meeting: Conduct meeting at project site. Conduct preinstallation meeting as part of general construction meeting or separately as necessary.

1.4 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 aluminum windows.

B. Shop Drawings: For aluminum 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 each exposed product and for each color specified, 2 by 4 inches in size.

D. Samples for Initial Selection: For units with factory-applied finishes.

1. Include Samples of hardware and accessories involving color selection.

E. Samples for Verification: For aluminum windows and components required, showing full range of color variations for finishes, and prepared on Samples of size indicated below:

1. Exposed Finishes: 2 by 4 inches.
2. Exposed Hardware: Full-size units.

F. Product Schedule: For aluminum windows. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer and Installer.

B. Product Test Reports: For each type of aluminum window, for tests performed by a qualified testing agency.

C. Field quality-control reports.

D. Sample Warranties: For manufacturer's warranties.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum windows that meet or exceed performance requirements indicated and of documenting this performance by test reports and calculations.

B. Installer Qualifications: An installer acceptable to aluminum window manufacturer for installation of units required for this Project.

C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockup of typical wall area as shown on Drawings.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace aluminum 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, condensation, 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. Aluminum Finish: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain aluminum 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: AAMA 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: AW.

2. Minimum Performance Grade: PG80.

C. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.35 Btu/sq. ft. x h x deg F.

D. Options in "Solar Heat-Gain Coefficient (SHGC)" Paragraph below are based on ENERGY STAR requirements. First option is for North-Central Climate Zone, second is for South-Central Climate Zone, and third is for Southern Climate Zone. Northern Climate Zone does not have a maximum SHGC.

E. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.40.

F. Condensation-Resistance Factor (CRF): Provide aluminum windows tested for thermal performance according to AAMA 1503, showing a CRF of 52.

G. Thermal Movements: Provide aluminum windows, including anchorage, that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F ambient; 180 deg F material surfaces.

H. Sound Transmission Class (STC): Rated for not less than 30 STC when tested for laboratory sound transmission loss according to ASTM E90 and determined by ASTM E413.

I. Outside-Inside Transmission Class (OITC): Rated for not less than 26 OITC when tested for laboratory sound transmission loss according to ASTM E 90 and determined by ASTM E 1332.

2.3 ALUMINUM WINDOWS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Kawneer North America.
    a. Kawneer 8400TL Thermal Windows.

2. EFCO Corporation. Equivalent as approved by Architect.

B. Operating Types: Provide the following operating types in locations indicated on Drawings:

1. Horizontal Sliding Windows.

C. Frames and Sashes: Aluminum extrusions complying with AAMA/WDMA/CSA 101/I.S.2/A440.

1. Thermally Improved Construction: Fabricate frames and sashes with an integral, concealed, low-conductance thermal barrier located between exterior materials and window members exposed on interior side in a manner that eliminates direct metal-to-metal contact.

D. 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: Clear anodic coating.

E. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.

F. 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 GLAZING

A. Glazing: Comply with Section 08 80 00 "Glazing."

B. Glazing Gaskets: Comply with Section 08 80 00 "Glazing."

C. Glazing Sealants: Comply with Section 08 80 00 "Glazing."

2.5 ACCESSORIES

A. Subsills: Thermally broken, extruded-aluminum subsills in configurations indicated on Drawings.

B. Interior Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.

C. Panning Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.

D. Receptor System: Two-piece, snap-together, thermally broken, extruded-aluminum receptor system that anchors windows in place.

2.6 FABRICATION

A. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.

B. Glaze aluminum windows in the factory.

C. Glass pocket/glazing pocket must be pressure equalized and weeped at both fixed and operable glazing utilizing a gasket or heel bead at interior of all lites of glass.

D. Weather strip each operable sash to provide weathertight installation.

E. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.

F. Provide water-shed members above side-hinged sashes and similar lines of natural water penetration.

G. 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.

H. 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.

2.7 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.8 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Kawneer Permanodic AA-M10C21A31, AAMA 611, Architectural Class II Clear Anodic Coating (Color #17 Clear) (Standard).

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.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 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 E 2112.

B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.

D. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 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. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

1. Keep protective films and coverings in place until final cleaning.

C. Remove and replace glass that 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 08 51 13

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Mechanical door hardware for the following:

    a. Swinging doors.
    b. Hardware for wood, hollow metal, and miscellaneous doors as noted.
    c. Thresholds.
    d. Smoke and draft control seals.
    e. Weatherstripping and gasketing.

2. Cylinders for door hardware specified in other Sections.
3. Electrified door hardware.

B. Work under this section includes finishing and installing the finish and security hardware requirements for the project. Items not specifically mentioned but necessary to complete the work, shall be furnished, matching the items specified in quality, and finish

C. Key Abbreviations: The following Key abbreviations apply to this section:

1. HW Hardware
2. MHO Magnetic Hold Open
3. PH Panic Hardware
4. RM Removable Mullion
5. S Smoke Seal
6. TH Threshold

D. Related Requirements:

1. Section 06 41 16 "Plastic-Laminate-Clad Architectural Cabinets" for cabinet door hardware provided with cabinets.
2. Section 08 11 13 "Hollow Metal Doors and Frames" for astragals provided as part of labeled fire-rated assemblies and for door silencers provided as part of hollow-metal frames].
3. Section 08 12 13 "Hollow Metal Frames" for astragals provided as part of labeled fire-rated assemblies and for door silencers provided as part of hollow-metal frames.
4. Section 08 14 16 "Flush Wood Doors" for astragals and integral intumescent seals provided as part of labeled fire-rated assemblies.

1.3 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.

B. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen 2019.

C. DHI (H&S) - Sequence and Format for the Hardware Schedule 2019.

D. DHI (KSN) - Keying Systems and Nomenclature 2019.

E. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames 2004.

F. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Flush Wood Doors 1993; also in WDHS-1/WDHS-5 Series, 1996.

G. ICC (IBC) - International Building Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

H. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

I. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

J. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2022.

K. NFPA 101 - Life Safety Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

L. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives 2022.

M. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies 2022.

N. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.

1.4 ALLOWANCES

A. Door hardware is part of Door Hardware Allowance.

1.5 QUALITY CONTROL

A. Supplier: Finish Hardware shall be supplied by recognized builder's hardware supplier who has been furnishing hardware in the same area as the project for a period of not less than two years. The supplier's organization shall include a member of the American Society of Architectural Hardware Consultants who is available at all reasonable times during the course of the work to meet with the Owner, Architect, or Contractor for project hardware consultation. Supplier shall be located within 200 miles of the project. Supplier shall be a distributor for the specified products, not a broker. Supplier shall maintain a warehouse and stock of specified hardware and replacement parts.

B. Installer: Finish Hardware shall be installed only by experienced tradesmen in compliance with trade union jurisdictions, either at the door and frame fabrication plant or at the project site.

C. Codes: All Finish Hardware shall comply with applicable local and/or state current building codes. Hardware for fire-rated openings shall also be in compliance with all fire building codes applicable to the district in which the building is located. Provide only hardware which has been tested and listed by UL for the types and sizes of doors required, and which complies with the requirements of the Door and Door Frame Labels.

1.6 COORDINATION

A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.

B. Sequence installation to ensure facility services connections are achieved in an orderly and expeditious manner.

C. Floor-Recessed Door Hardware: Coordinate layout and installation with floor construction.

1. Cast anchoring inserts into concrete.

D. 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.

E. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

F. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

G. 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.

1.7 PREINSTALLATION MEETINGS

A. Preinstallation Meeting: Conduct meeting at project site. Conduct preinstallation meeting as part of general construction meeting or separately as necessary as determined by the Architect.

1. A. Preinstallation Meeting participants shall include Architect, Hardware Installer, Installer's Architectural Hardware Consultant and Owner's security consultant.

B. Keying Conference: Conduct conference at Project site.

1. Schedule meeting at project site prior to Contractor occupancy.
2. Attendance Required:

a. Contractor.
b. Owner.
c. Hardware Supplier’s Architectural Hardware Consultant (AHC).
d. Door Hardware Installer.
e. Owner's Security Consultant.
f. Cylinder Manufacturer’s Keying Consultant

3. Agenda:

a. Establish keying requirements.
b. Verify locksets and locking hardware are functionally correct for project requirements.
c. Verify that keying and programming complies with project requirements.
d. Establish keying submittal schedule and update requirements.

4. Incorporate "Keying Requirements Meeting" decisions into keying submittal upon review of door hardware keying system including, but not limited to, the following:
    a. Flow of traffic and degree of security required
    b. Access control requirements
    c. Key control system requirements.
    d. Preliminary key system schematic diagram
5. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.
6. Deliver established keying requirements to manufacturers.

1.8 ACTION SUBMITTALS

A. Product Data: For each type of product.
    1. Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.

B. Shop Drawings: For electrified door hardware.
    1. Include diagrams for power, signal, and control wiring for electrified door hardware that include details of interface with building safety and security systems. Provide elevations and diagrams for each electrified door opening as follows:
        a. Prepared by or under supervision of Architectural Hardware Consultant (AHC) and Electrified Hardware Consultant (EHC).
        b. Elevations: Include front and back elevations of each door opening showing electrified devices with connections installed and an operations narrative describing how opening operates from either side at any given time.
        c. Diagrams: Include point-to-point wiring diagrams that show each device in door opening system with related colored wire connections to each device.

C. Samples: For each exposed product in each finish specified, in manufacturer's standard size.
    1. Tag Samples with full product description to coordinate Samples with door hardware schedule.

D. Samples for Verification: For each type of exposed product, in each finish specified.
    1. Submit one (1) sample of hinge, latchset, lockset, and closer, illustrating style, color, and finish.
    2. 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.
    3. Tag Samples with full product description to coordinate Samples with door hardware schedule.

E. Door Hardware Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant. Coordinate door hardware schedule with doors,

frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

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

F. Keying Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant, 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. After meeting with the Owner and/or Architect to discuss specific keying requirements, submit electronic copy of keying schedules.

G. Wiring Diagrams: Provide complete wiring diagram and information for each electro-mechanical or electro-magnetic device.

1.9 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates: For each type of electrified door hardware.

1. Certify that door hardware for use on each type and size of labeled fire-rated doors complies with listed fire-rated door assemblies.

C. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

D. Product Test Reports: For compliance with accessibility requirements, for tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.

E. Field quality-control reports.

F. Sample Warranty: For special warranty.

1.10 CLOSEOUT SUBMITTALS

A. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

B. Maintenance Data: For all door hardware products with sequence of items, materials and methods used for proper cleaning and maintenance of each item.

C. Maintenance Materials and Tools: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 60 00 - Product Requirements, for additional provisions.
2. Tools: One set of each special wrench or tool applicable for each different or special hardware component, whether supplied by hardware component manufacturer or not.

D. Schedules: Final door hardware and keying schedule.

1.11 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. Door Hardware: One unit of each item specified.
2. Electrical Parts: None.

1.12 QUALITY ASSURANCE

A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and of an Architectural Hardware Consultant who is available during the course of the Work to consult Contractor, Architect, and Owner about door hardware and keying.

1. Warehousing Facilities: In Project's vicinity.
2. Scheduling Responsibility: Preparation of door hardware and keying schedule.
3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and of an Architectural Hardware Consultant who is available during the course of the Work to consult Contractor, Architect, and Owner about door hardware and keying.

1. Warehousing Facilities: In Project's vicinity.
2. Scheduling Responsibility: Preparation of door hardware and keying schedule.

1.13 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. Basic installation instructions shall be included.

C. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.14 WARRANTY

A. Special Warranty: 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 Period: Finish hardware shall be guaranteed against defects in workmanship and operation for a period of One years from date of Substantial Completion unless otherwise indicated below:

a. Electromagnetic and Delayed-Egress Locks: Five years from date of Substantial Completion.
b. Exit Devices: Five years from date of Substantial Completion.
c. Manual Closers: Twenty years from date of Substantial Completion.
d. Locksets and Cylinders: Three years from date of Substantial Completion.
e. Other Hardware: Two years, minimum from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.

B. Door Pulls and Push Plates:

1. Provide door pulls and push plates on doors without a lockset, latchset, exit device, or auxiliary lock unless otherwise indicated.

C. Closers:

1. Provide closers on doors without a lockset, latchset, exit device, or auxiliary lock unless otherwise indicated.
2. Provide door closer on each fire-rated and smoke-rated door.

D. Thresholds:

1. Exterior Applications: Provide at each exterior door, unless otherwise indicated.

E. Smoke and Draft Control Seals:

1. Provide gasketing for smoke and draft control doors (Indicated as "S" on Drawings) that complies with local codes, requirements of assemblies tested in accordance with UL 1784.

F. Weatherstripping and Gasketing:

1. Provide weatherstripping on each exterior door at head, jambs, and meeting stiles of door pairs, unless otherwise indicated.
2. Provide door bottom sweep on each exterior door, unless otherwise indicated.
3. Fabricate as continuous gasketing, do not cut or notch gasketing material

G. Electrically Operated and/or Controlled Hardware: Provide necessary power supplies, power transfer hinges, relays, and interfaces as required for proper operation; provide wiring between hardware and control components and to building power connection in compliance with NFPA 70.

H. Fasteners:

1. Provide fasteners of proper type, size, quantity, and finish that comply with commercially recognized standards for proposed applications.
2. Provide machine screws for attachment to reinforced hollow metal and aluminum frames.
3. Provide stainless steel machine screws and lead expansion shields for concrete and masonry substrates.
4. Provide wall grip inserts for hollow wall construction.
5. Fire-Resistance-Rated Applications: Comply with NFPA 80.
6. Concealed Fasteners: Do not use through or sex bolt type fasteners on door panel sides indicated as concealed fastener locations, unless otherwise indicated or required per manufacturer's testing requirements.

2.2 MANUFACTURERS

A. Items used are from the catalogs of:

1. ABH Manufacturing
2. Best Access Systems
3. Sargent Manufacturing
4. Medeco
5. Architectural Control Systems, Inc.
6. Dormakaba Americas
7. Rockwood Manufacturing Company
8. Mason Industries
9. McKinney Products Company
10. National Guard Products
11. Pemko Products
12. Trimco Hardware
13. Tice Industries
14. Record North America
15. Don-Jo Mfg.

B. Except as shown in the following paragraphs, no other substitutions are allowed.

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

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

2.3 PERFORMANCE REQUIREMENTS

A. Provide door hardware products that comply with applicable provisions of federal, state, and local codes including, but not limited to, ICC (IBC), NFPA 101 and Local codes as required.

B. Provide door hardware products that comply with:

1. Hardware Preparation for Steel Doors and Steel Frames: BHMA A156.115.
2. Hardware Preparation for Wood Doors with Wood or Steel Frames: BHMA A156.115W.

C. Regulatory and Operational Requirements:

1. Provide hardware for all openings, whether specified or not, in compliance with NFPA Standard No. 80, proper operation and local building code requirements. Where required, provide only hardware which has been tested and listed by UL or FM for types and sizes of doors required and complies with requirements of door and door frame labels. Label hardware, as required, for compliance with pressure testing criteria as dictated in IBC.
2. Provide hardware which meets or exceeds handicap accessibility per local building code requirements. Conform to the Americans with Disabilities Act (ADA) of 1990 as amended by the D.O.J. September 15, 2010, as adopted by the Authority Having Jurisdiction (AHJ).

D. 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.

E. 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.

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

G. 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.

H. Accessibility Requirements: For door hardware on doors in an accessible route, comply with 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 lb/f applied perpendicular to door.
    b. Sliding or Folding Doors: 5 lb/f applied parallel to door at latch.
    c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.
4. Adjust door closer sweep periods so that, from an open position of 90 degrees, the door will take at least 5 seconds to move to a position of 12 degrees from the latch.
5. Adjust spring hinges so that, from an open position of 70 degrees, the door will take at least 1.5 seconds to move to the closed position.

2.4 HINGES

A. Butt Hinges Manufacturer: McKinney

1. Acceptable Substitutions: Hager, Bommer.
2. Products:
   a. Concealed or Exposed bearing, five (5) knuckle.
   b. Plain Bearing, Five (5) Knuckle
3. Applicable to each item specified:
   a. Standard Weight Hinges: Minimum of two (2) permanently lubricated non-detachable bearings.
   b. Heavy Weight Hinges: Minimum of four (4) permanently lubricated bearings on heavy weight hinges.
   c. Template screw hole locations.
   d. Pins: Easily seated, non-rising pins.
   e. UL 10C listed for fire-resistance-rated doors.
4. Finish: US32D Satin Stainless Steel exterior / US26D Satin chrome interior.
5. Grades: Comply with BHMA A156.1 and BHMA A156.7 for templated hinges.
6. Types: Include full mortise hinges.
7. Provide non-removable pins at all doors with locking hardware.
8. Quantities: Three (3) hinges per leaves up to 90 inches in height. Add one (1) for each additional 30 inches in height or fraction thereof.
   a. For doors up to 36 inches wide and up to 1-3/4 inches thick provide hinges with a minimum thickness of 0.134 inch and a minimum of 4-1/2 inches in height.
   b. For doors from 36 inches wide up to 42 inches wide and up to 1-3/4 inches thick provide hinges with a minimum thickness of 0.145 inch and a minimum of 4-1/2 inches in height.
   c. For doors from 42 inches wide up to 48 inches wide and up to 1-3/4 inches thick provide hinges with a minimum thickness of 0.180 inch and a minimum of 5 inches in height.
   d. For doors greater than 1-3/4 inches thick provide hinges with a minimum thickness of 0.180 inch and a minimum of 5 inches in height.
9. Non-Standard Sizes: For unusual size or weight doors, furnish type, size and quantity recommended by the hinge manufacturer.

   a.

Function Description	Factory Number	and Size
Full Mortise, Standard Weight	TA2714	4-1/2 x 4-1/2”
Full Mortise, Heavy Weight	T4A3786	4-1/2 x 4-1/2”
Full Mortise, Standard Wt., Non-Ferrous	TA2314	4-1/2 x 4-1/2”
Full Mortise, Heavy Wt., Non-Ferrous	T4A3386	5 x 4-1/2”
Full Mortise, Heavy Wt.	T4A3786	5 x 4-1/2”

B. Self-Closing Hinges and Pivots
1. Self-Closing Hinges and Pivots: BHMA A156.17.

2.5 MECHANICAL LOCKS AND LATCHES

A. Lock Functions: As indicated in door hardware schedule.

B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:

1. Bored Locks: Minimum 1/2-inch latch bolt throw.
2. Mortise Locks: Minimum 3/4-inch latch bolt throw.
3. Deadbolts: Minimum 1.25-inch bolt throw.

C. Lock Backset: 2-3/4 inches unless otherwise indicated.

D. Lock Trim:

1. Dummy Trim: Match lever lock trim and escutcheons.

E. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

1. Flat-Lip Strikes: For locks with three-piece antifriction latch bolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.
4. Rabbet Front and Strike: Provide on locksets for rabbeted meeting stiles.

F. Bored Locks: BHMA A156.2; Grade 1; Series 4000.

G. Mortise Locks: BHMA A156.13; Operational Grade 1; stamped steel case with steel or brass parts; Series 1000.

H. Interconnected Locks: BHMA A156.12; Grade 1; Series 5000.

I. Roller Latches: BHMA A156.16; Grade 1; rolling plunger that engages socket or catch, with adjustable roller projection.

J. Push-Pull Latches: Bored, BHMA A156.2; Series 4000 or Mortise, BHMA A156.13]; with paddle handles that retract latch bolt; capable of being mounted vertically or horizontally.

2.6 MORTISE LOCKS

A. Manufacturer Listed: Sargent 8200 series mortise.
1. Acceptable Substitutions: None – facility standard

B. Products: Mortise locks, including standard and electrified types.

C. Properties: Mechanical Locks: Manufacturer's standard

1. Fitting modified ANSI A115.1 door preparation.
2. Door Thickness Coordination Fitting 1-3/4 inch to 2-1/4 inch thick doors.
3. Latch: Solid, one-piece, anti-friction, self-lubricating stainless steel or manufacturer’s standard anti friction as required.
   a. Latchbolt Throw: 3/4 inch, minimum
4. Auxiliary Deadlatch: One piece stainless steel, permanently lubricated.
5. Backset: 2-3/4 inch.

D. Lever Trim: LW1L

1. Functionality: Allow the lever handle to move up to 45 degrees from horizontal position prior to engaging the latchbolt assembly.
2. Strength: Locksets outside locked lever designed to withstand minimum 1,400 inch-lbs of torque. In excess of that, a replaceable part will shear. Key from outside and/or inside lever will still operate lockset.
3. Spindle: Designed to prevent forced entry from attacking of lever.
4. Independent spring mechanism for each lever.
5. Trim to be self-aligning and thru-bolted

E. Finish: US32D (Satin Stainless)

F. Core Faces: Match finish of lockset

G. Compatibility with 7 pin core.

H. All locksets and latchsets shall be the product of one manufacturer.

2.7 CYLINDRICAL LOCKS

A. Manufacturer listed: Sargent 10X Line series cylindrical.
1. Acceptable substitutions: None – facility standard.

B. Properties: Lock Cylinders: Provide key access on outside of each lock, unless otherwise indicated
1. Provide cylinders from same manufacturer as locking device.
2. Provide cams and/or tailpieces as required for locking devices.
3. Provide cylinders with appropriate format interchangeable cores where indicated.

C. Finish: US32D (Satin Stainless)

D. Trim design LW1L

E. Compatibility with 7 pin core.

F. All locksets and latchsets shall be the product of one manufacturer.

2.8 CYLINDERS

A. Manufacturer Listed: Medeco
1. Acceptable Substitutions: None – facility standard

B. Products: Rim/mortise.

C. Material:
1. Manufacturer's standard corrosion-resistant brass alloy.
2. Finish: US26D (Satin Chrome).

D. Properties: Provide cylinders for all key operated locks, exit devices and mullions.
1. Provide cylinders from same manufacturer as locking device.
2. Provide cams and/or tailpieces as required for locking devices.
3. Provide cylinders with appropriate format interchangeable cores where indicated.

2.9 AUXILIARY LOCKS

A. Bored Auxiliary Locks: BHMA A156.36: Grade 1; with strike that suits frame.

B. Mortise Auxiliary Locks: BHMA A156.36; Grade 1; with strike that suits frame.

C. Narrow Stile Auxiliary Locks: BHMA A156.36; Grade 1; with strike that suits frame.

D. Push-Button Combination Locks: BHMA A156.36; cylindrical; Grade 1; lock opens by entering a one- to five-digit code by pushing correct buttons in correct sequence; automatically relocks when door is closed; with strike that suits frame.

2.10 ELECTRIC STRIKES

A. Electric Strikes: BHMA A156.31; Grade 1; with faceplate to suit lock and frame.

2.11 ELECTROMAGNETIC LOCKS

A. Electromagnetic Locks: BHMA A156.23; electrically powered; with electromagnet attached to frame and armature plate attached to door; full-exterior or full-interior type, as required by application indicated.

B. Delayed-Egress Electromagnetic Locks: BHMA A156.24, electrically powered, with electromagnet attached to frame and armature plate attached to door; depressing push bar for more than three seconds initiates irreversible alarm and adjustable time delay for egress. When integrated with fire alarm, fire alarm voids time delay.

2.12 SURFACE BOLTS

A. Surface Bolts: BHMA A156.16.

2.13 MANUAL FLUSH BOLTS

A. Manual Flush Bolts: BHMA A156.16; minimum 3/4-inch throw; designed for mortising into door edge.

2.14 AUTOMATIC AND SELF-LATCHING FLUSH BOLTS

A. Automatic Flush Bolts: BHMA A156.3, Type 25; minimum 3/4-inch throw; with dust-proof strikes; designed for mortising into door edge, include wear plates.

B. Self-Latching Flush Bolts: BHMA A156.3, Type 27; minimum 3/4-inch throw; with dust-proof strikes; designed for mortising into door edge, include wear plates.

2.15 EXIT DEVICES

A. Manufacturer Listed: Sargent
   1. Acceptable Substitutions: None – facility standard

B. Properties:
   1. Touchpads: 'T" style metal touchpads and rail assemblies with matching chassis covers end caps.
   2. Latch Bolts: Stainless steel deadlocking with 3/4 inch projection using latch bolt.
   3. Cylinder: Include where cylinder dogging or locking trim is indicated.
   4. Strike as recommended by manufacturer for application indicated.
   5. Sound dampening on touch bar.
   6. Dogging

a. Non-Fire-Resistance-Rated Devices: Cylinder dogging.
b. Fire-Resistance-Rated Devices: Manual dogging not permitted

7. Handing: Field-reversible

C. Grades: Complying with BHMA A156.3, Grade 1

D. Standards Compliance:
1. Provide UL (DIR) listed exit device assemblies for fire-resistance-rated doors.
2. Comply with UL 10C.

E. Code Compliance: As required by authorities having jurisdiction in the State in which the Project is located.

2.16 LOCK CYLINDERS

A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.

B. Standard Lock Cylinders: BHMA A156.5; Grade 1, permanent cores; face finished to match lockset.
1. Core Type: Interchangeable.

C. High-Security Lock Cylinders: BHMA A156.30; Grade 1 permanent cores that are removable; face finished to match lockset.
1. Type: E, electrical.

D. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 6 construction master keys.

E. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 6 construction master keys.

2.17 KEY AND CORES

A. Manufacturer Listed: Medeco
1. Acceptable Substitutions: None – facility standard

B. All key operated products (Locksets, Cylinders, Deadlocks, etc.) specified under this Section shall be keyed to the existing Medeco Grand Master Key system.

C. Keying shall be provided directly to Medeco Lock by the Owner. Permanent Cores and Keys shall be sent direct from the lock manufacture via Registered Mail, Return Receipt Requested, to the Owner.
1. Supply brass construction cores during construction. Provide permanent cores to the owner. The contractor shall install the permanent cores

D. Properties: Complying with guidelines of BHMA A156.28
1. Provide small format interchangeable core.
2. Provide keying information in compliance with DHI (KSN) standards.
3. Keying Schedule: Arrange for a keying meeting, with Architect, Owner and hardware supplier, and other involved parties to ensure locksets and locking hardware, are functionally correct and keying complies with project requirements.
4. Keying: Master keyed.
5. Include construction keying and control keying with removable core cylinders.

6. Do not make brass construction cores and construction control and operating keys a part of Owner's permanent keying system, nor furnish in the same keyway (or key section) as Owner permanent keying system.
7. Key to new keying system.
8. Supply keys in following quantities:
   a. Building Grand Master Keys: 4 each.
   b. Master Keys: 4 each.
   c. Change Keys per Lockset or Cylinder: 4 each
   d. Permanent Control keys: 2 each
   e. Construction Control Keys: 2 each.
   f. Construction Keys: 6 each.
9. Provide key collection envelopes, receipt cards, and index cards in quantity suitable to manage number of keys.
10. Deliver keys with identifying tags to Owner by security shipment direct from manufacturer.
11. Permanent Keys and Cores: Stamped with applicable key marking for identification. Do not include actual key cuts within visual key control marks or codes. Stamp permanent keys "Do Not Duplicate."
12. Include installation of permanent cores and return construction cores to hardware supplier. Construction cores and construction keys to remain property of hardware supplier.
13. Provide two copies of corrected Finish Hardware Schedules along with two each Construction Master and Control Keys, 90 days prior to Substantial Completion to Snoqualmie Valley School District.

E. Keys: Brass.
   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.**

2.18 PUSH & PULLS

A. Manufacturer: TICE (Custom make for District)
   1. Acceptable substitutions: None – facility standard
   2. 4 mounting bolts per pull
   3. Keyhole to have vertical offset per School district template

2.19 WRAP AROUND COVER PLATES FOR LATCH SETS

A. Manufacturer Listed: Don-Jo Mfg.

B. Properties:
   1. Provide one piece wrap around cover plates that cover front face, back face and end of door at latchset. Provide radius corners at face with screw holes. Provide holes for door latch hardware levers and body. Provide recessed end for latch plate.
   2. Provide for latchset as specified unless otherwise noted.

C. Material: 22 Ga. Stainless Steel.

D. Finish: Satin Stainless Steel 630

E. Size: Unless otherwise noted, all plates shall have overall dimensions of 4 3/4”x9”x1 3/4”.

F. Fasteners: Pan head or Round head screw fasteners to match plate per mfr.

2.20 OPERATING TRIM

A. Operating Trim: BHMA A156.6; stainless steel unless otherwise indicated.

2.21 SURFACE CLOSERS

A. Manufacturer Listed: Sargent 281 Series
   1. Acceptable substitutions: None – facility standard

B. Types:
   1. Rack-and-pinion, surface-mounted. 1-1/2 inches minimum bore.
   2. Include the manufacturer’s adjustable delayed action feature on all closers.

C. Properties:
   1. Surface Mounted Closers: Manufacturer's standard
      a. Construction: R14 high silicon aluminum alloy or cast iron.
      b. Covers:
         1) Type: Standard for product selected.
            a) Full
         2) Material: Plastic.
         3) Finish: Painted.

D. Grades: Comply with BHMA A156.4, Grade 1
   1. Underwriters Laboratories Compliance
   2. Testing Standards Compliance: Meeting requirements of UL 10C for positive pressure.

E. Code Compliance: As required by authorities having jurisdiction in the State in which the Project is located.

F. Installation:
   1. Mounting: Includes surface mounted installations.
   2. Mount closers on non-public side of door and stair side of stair doors unless otherwise noted in hardware sets.
   3. At out swinging exterior doors, mount closer on interior side of door.
   4. Provide adapter plates, shim spacers, and blade stop spacers as required by frame and door conditions.
   5. “Closer Adapter Plate” Provide drop plates where required for installation on narrow top door rails above glazing as required.
   6. Where an overlapping astragal is included on pairs of swinging doors, provide coordinator to ensure door leaves close in proper order when automatic flush bolts are used
   7. Furnish sex nuts and bolts for all doors wood and hollow metal and aluminum.
   8. Furnish shoe supports for all closers.
   9. Provide closers with proper spring power adjustment to meet ADA.

10. Provide special closer mounting as required where interference with weatherstrip or sound seal occurs. Do not notch Weather Strip at frame head for closer foot.

2.22 MECHANICAL STOPS AND HOLDERS

A. Manufacturer Listed: Trimco
   1. Acceptable Substitutions: Rockwood, Ives.

B. Types
   1. Wall Bumpers: Bumper, convex, wall stop.
      a. Basis of design: 1270CXSV
   2. Floor Stops: Provide with rubber bumper floor stop, heavy duty as specified.
      a. Basis of design: 1215CKU
   3. Floor Pipe Stops: Provide with wrap around rubber bumper set into conc., heavy duty as specified.
      a. Basis of design: 1209HA
   4. Floor Pipe Stops/Holders: Provide with wrap around rubber bumper set into conc., heavy duty as specified. Includes hold open feature.
      a. Basis of design: 1209HOHA

C. Grades: Comply with BHMA A156.6.

D. Material: Base metal as indicated for each item by BHMA material and finish designation.

E. Finish: US26D (Satin Chrome).

F. Installation:
   1. Non-Masonry Walls: Confirm adequate wall reinforcement has been installed to allow lasting installation of wall bumpers.

G. General:
   1. Provide overhead stop/holder when wall or floor stop is not feasible.
   2. Provide stops to protect all walls, cabinet work or hardware operation.
   3. Wall stops shall be used wherever possible, unless otherwise called for in hardware sets.
   4. Where wall stops are not applicable, furnish floor stop or vise-versa. Provide proper height floor stops to suit conditions.
   5. Contractor to provide solid blocking for all wall mounted stops.
   6. Provide extra floor stops for use where wall stop won't work.
   7. At the end of the job turn over all extra wall and floor stops to the owner.

2.23 DOOR GASKETING AND WEATHERSTRIPPING

A. Manufacture Listed: Pemko
   1. Acceptable Substitutions: National Guard, Reese

B. Products:
   1. Weatherstripping: See Door Hardware Schedule.
   2. Door Bottom Seals:
      a. Door Sweeps: See Door Hardware Schedule.

b. Door Shoes: See Door Hardware Schedule.

C. Grades: Comply with BHMA A156.22.

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

E. Maximum Air Leakage: When tested according to ASTM E283 with tested pressure differential of 0.3-inch wg, as follows:
1. Smoke-Rated Gasketing: 0.3 cfm/sq. ft. of door opening.
2. Gasketing on Single Doors: 0.3 cfm/sq. ft. of door opening.
3. Gasketing on Double Doors: 0.50 cfm per ft. of door opening.

F. Finish: Weatherstripping: Clear Anodized Aluminum

G. Where smoke gasket is specified, provide Pemko S88D

2.24 DOOR SILENCERS

A. Manufacturer Listed: Trimco
1. Acceptable Substitutions: Ives, Rockwood

B. Type: 1229

C. Properties: Provide at equal locations on door frame to mute sound of door's impact upon closing.
1. Single Door: Provide three on strike jamb of frame.
2. Pair of Doors: Provide two on head of frame, one for each door at latch side.

D. Material: Rubber, gray color.

2.25 THRESHOLDS

A. Manufacturer Listed: Pemko

1. Acceptable Substitutions: Reese, National Guard.

B. Types: As applicable to project conditions. Provide barrier-free type at every location where specified.

C. Properties: Threshold Surface: Fluted horizontal grooves across full width.

D. Finish: Mill Finish Aluminum.

E. Provide Pemko FHSL-14 anchors for all thresholds

2.26 THRESHOLD/ MODULAR RAMP SYSTEMS

A. Manufacturer Listed: Pemko
1. Acceptable Substitutions: Reese, National Guard.

B. Types: Barrier-free type at every location where specified and as applicable to project conditions. Ramp height to accommodate project changes in level.

C. Properties: Threshold Surface: Fluted horizontal grooves across full width.

D. Finish: Pemkote Non-slip Finish Aluminum.

E. Provide Miter returns to match selected ramp.

F. Provide Pemko FHSL-14 anchors for all thresholds

2.27 METAL KICK PLATES, Mop Plates, Armor Plates

A. Manufacturer Listed: Tice
   1. Acceptable Substitutions: Trimco, Rockwood

B. Anything listed as a Kick Plate can be a Kick Plate, Armor Plate or Mop Plate within the full dimensional range up to 48” in width and 48” in height.

C. Properties:
   1. Kick Plates: Provide along bottom edge of push side of every wood door with closer, except aluminum storefront and glass entry doors, unless otherwise indicated.
   2. Edges: Beveled, on four (4) unless otherwise indicated.

D. Grades: Comply with BHMA A156.6.

E. Material: As indicated for each item by BHMA material and finish designation.

F. Finish: .050 Stainless Steel

G. Size: All plates shall be 2” less than door width on push side of door, except pairs of doors shall be 1” less than door width. All Plates shall be 1” less than door width on pull side.
   1. Kick Plates shall be 7” to 16” in height
   2. Armor Plates shall be 17” to 48” in height
   3. Mop Plates shall be up to 6” in height.

H. Installation:
   1. Kick Plates and Armor Plates shall be applied to Push side of door, unless otherwise indicated in hardware schedule. Mop Plate shall be applied to the Pull Side of door.
   2. Furnish Two (2) Kick Plates for pair openings.
   3. Fasteners: Countersunk screw fasteners

2.28 AUXILIARY DOOR HARDWARE

A. Auxiliary Hardware: BHMA A156.16.

2.29 AUXILIARY ELECTRIFIED DOOR HARDWARE

A. Auxiliary Electrified Door Hardware:

2.30 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.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance of the Work.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. 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 door and hardware manufacturers' written instructions.

C. Do not install surface mounted items until application of finishes to substrate are fully completed.

D. Wash down masonry walls and complete painting or staining of doors and frames.

E. Complete finish flooring prior to installation of thresholds

3.3 INSTALLATION

A. Installation by skilled mechanics to architect’s satisfaction.
   1. Conform strictly to manufacturer’s templates and directions.
   2. Conform to referenced IBC and UL requirements.

B. Install hardware on fire-rated doors and frames in accordance with applicable codes and NFPA 80.

C. Install hardware for smoke and draft control doors in accordance with NFPA 105.

D. Mounting Heights: Mount door hardware units at heights indicated on Drawings unless otherwise indicated or required to comply with governing regulations.
   1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
   2. Custom Steel Doors and Frames: HMMA 831.
   3. Wood Doors: DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors."

E. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and

reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Adjust movable parts to operate perfectly at time of final acceptance
   a. Make further adjustments required during guarantee period
3. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
4. Replace hardware which has been damaged by use when damage is caused by faulty installation.
5. Make mortises accurately to exactly receive hardware. Depth or Mortises such that hardware is flush with finish surfaces.

F. Hardware Placement: Locate hardware on doors as follows:
   1. Comply with accessibility code where more stringent requirements are indicated.
   2. Dimensions are from the finished floor to centerline unless shown otherwise.
      a. Lock/Latch: 40” centerline of strike.
      b. Exit Device Cross Bar: 40” centerline of bar
      c. Deadlock Cylinder: 48”
      d. All other items are manufacturer’s instructions or as directed.

G. Fasteners: Drill appropriate size guide holes for all wood screws. Drill and tap metal doors and frames to receive manufacturer’s machine screws.
   1. Install hardware using the manufacturer’s fasteners provided.
   2. Do not use sheet metal or “TEK” screws to install hardware.
   3. Self tapping screws will not be allowed.
   4. Use cast-in-place anchor bolts or steel expansion shield for all items supported by, or on, concrete

H. Use cast-in-place anchor bolts or steel expansion shield for all items supported by, or on, concrete

I. 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.

J. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule, but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every 30 inches of door height greater than 90 inches.

K. Lock Cylinders: Install construction cores to secure building and areas during construction period.
   1. Furnish permanent cores to Owner for installation.

L. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room. Verify location with Architect.
   1. Configuration: Provide one power supply for each door opening with electrified door hardware.

M. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 07 92 00 "Joint Sealants." Cut and fit thresholds to profiles of door jambs with mitered corners and precision joints.
   1. Set exterior thresholds in bed of butyl rubber sealant and fill all voids to exclude moisture.
      a. Do not block any weep holes
      b. Remove excess sealant.
   2. Align the bevel of exterior thresholds with exterior face of door, unless detailed otherwise.
   3. Thresholds shall be installed level.

N. 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. Place door stops and holders to allow maximum swing.
   1. Doors not to contact anything but stop.

O. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
   1. Do not notch perimeter gasketing to install other surface-applied hardware.

P. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

Q. 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.
   2. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 70 degrees and so that closing time complies with accessibility requirements of authorities having jurisdiction.
   3. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.

B. Occupancy Adjustment: Approximately 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.

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 MAINTENANCE SERVICE

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

B. Maintenance Service: Beginning at Substantial Completion, maintenance service shall include six months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door and door hardware operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

3.8 DEMONSTRATION

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

3.9 DOOR HARDWARE SCHEDULE

A. MANUFACTURERS ABBREVIATION LIST

Code	Description
AB	ABH Manufacturing
AC	Architectural Control Systems, Inc
BE	Best Access Systems
DM	Dormakaba Americas
LC	LCN Closers
MC	McKinney Products Company
ME	Medeco
NA	National Guard Products
SA	Sargent Manufacturing
TR	Trimco Hardware
VO	Von Duprin Products
TI	Tice Industries
RE	Record North America
DJ	Don-Jo Mfg.

B. FINISH LIST

Code	Description
628	Satin Anodized Aluminum
626/652	Brushed Chrome Plated

630	Satin Stainless Steel
689	Aluminum Painted
GREY	Grey

C. OPTIONS

Code	Description
VIN	Visual Indicator (Best)
QEL	Motorized Latch Retraction (Von Duprin)
RX	Request to Exit (Von Duprin)
N Mounting	Spanner Through Bolt Mounting (Trimco)
B4E	Beveled 4 Edges – Kick and Mop Plates (Trimco)
CS	Counter Sinking of Kick And Mop Plates (Trimco)
SSMS/EA	Stainless Machine Screws/Expansion Anchors (NGP)

D. QUANTITIES: Quantities listed are for the contractors' convenience only and are not guaranteed.

1. Items not specifically mentioned but necessary to complete the work shall be furnished, matching in quality and finish the items specified

2. Provide the required quantity of items listed for a complete installation.

E. HARDWARE SCHEDULE: Provide Hardware as specified in the previous articles in sets according to the following schedule:

Hardware Group 1

Doors: 103B - (New exit door)

3	Ea	Hinge	T4A3786 4.5" x 4.5" NRP	626	MC
1	Ea	Exit Device	16-8888	630	SA
1	Ea	Mortise Cylinder (For Cyl. Dogging)	10W0500	626	ME
1	Ea	Core			ME
1	Ea	Door Pull	TIC3511D 32D Tice Dummy Finger pull	630	TI
1	Ea	Closer	281-O	626	SA
1	Ea	Kick Plate	B4EKP 10" x 34" B4E CS	630	TI
1	Ea	Pipe Stop / Holder	1209HOHA	626	TR
1	Ea	Weatherstrip	2891AS (Head) x 290AS Jambs		PE
1	Ea	Door Sweep	315 CN		PE
1	Ea	Saddle Threshold	2727A x 36" FHSL14		PE

Hardware Group 2

Doors: 103C - (New entry door to include card access)

2	Ea	Hinge	T4A3786 4.5" x 4.5" NRP	626	MC
1	Ea	Electric Hinge	T4A3786 4.5" x 4.5" NRP CC8	626	MC
*1	Ea	Exit Device	16-8888	630/626	SA
*1	Ea	Retraction Motor	1500-MD		AC
1	Ea	Rim Cylinder (For Active Exit Device)	10W0403	626	ME
1	Ea	Mortise Cylinder (For Cyl. Dogging)	10W0500	626	ME
2	Ea	Core			ME
1	Ea	Door Pull	CHI250VD CFC 35116 x 4 ea TACED-SB1024-AL Finger pull with cylinder hole vert offset ½"	630	TI
1	Ea	Closer	281-O	626	SA
1	Ea	Kick Plate	B4EKP 10" x 34" B4E CS	630	TI
1	Ea	Pipe Stop / Holder	1209HOHA	626	TR
1	Ea	Weatherstrip	2891AS (Head) x 290AS Jambs		PE
1	Ea	Door Sweep	315 CN		PE
1	Ea	Saddle Threshold	2727A x 36" FHSL14		PE
*1	Ea	Power Supply	by security		
*1	Ea	Card reader	by security		

Card activation momentarily retracts latches and allows access. Card reader by security access. Verify threshold application.

* Requires electronic coordination

Hardware Group 3

Doors: 138A, 140A - (New classroom door)

3 Ea	Hinges	TA2714 4.5" x 4.5"	626	MC
1 Ea	Cylindrical Lockset	10XG37 LL (Classroom)	626	SA
1 Ea	Core			ME
1 Ea	Closer	281-O	626	SA
1 Ea	Kick Plate	B4EKP 10" x 34" B4E CS	630	TI
1 Ea	Wall Bumper	1270CXSV	626	TR
1 Ea	Gasketing	S88D 17’		NA

Hardware Group 4

Doors: 138B,140B,134B,136C,127B,129B,130B,132B - (New kids toilet dutch door)

4 Ea	Hinges	TA2714 4.5" x 4.5"	626	MC
1 Ea	Cylindrical Lockset	10XU15 LL (Passage)	626	SA
1 Ea	Surface bolt 8”	3922	626	TR
1 Ea	Kick Plate	B4EKP 10" x 34" B4E CS	630	TI
1 Ea	Floor Stop	1215CKU	626	TR
4 Ea	Silencers	1229A	GREY	TR

Hardware Group 5

Doors: 116A, - (New Nurse interior entry door)

3 Ea	Hinges	TA2714 4.5" x 4.5"	626	MC
1 Ea	Cylindrical Lockset	10XG37 LL (Classroom)	626	SA
1 Ea	Core			ME
1 Ea	Kick Plate	B4EKP 10" x 34" B4E CS	630	TI
1 Ea	Floor Stop	1215CKU	626	TR
1 Ea	Gasketing	S88D 17’		NA

Hardware Group 6

Doors: 116B, 119 - (New exterior doors)

3 Ea	Hinge	TA2714 4.5" x 4.5"	626	MC
1 Ea	Cylindrical Lockset	10XG37 LL (Classroom)	626	SA
1 Ea	Core			ME
1 Ea	Closer	281-O	626	SA
1 Ea	Kick Plate	B4EKP 10" x 34" B4E CS	630	TI
1 Ea	Floor Stop	1215CKU	626	TR
1 Ea	Weatherstrip	2891AS (Head) x 290AS Jambs		PE
1 Ea	Door Sweep	315 CN		PE
1 Ea	Door Bottom	35 EV		NA
1 Ea	Threshold	196A 193A 195A FHSL14		PE

Hardware Group 7

Doors: 116C - (New Toilet room door)

3 Ea	Hinges	TA2714 4.5" x 4.5"	626	MC
1 Ea	Cylindrical Lockset	V30 10XU68 LL (Hospital Privacy)	626	SA
1 Ea	Core			ME
1 Ea	Kick Plate	B4EKP 10" x 34" B4E CS	630	TI
1 Ea	Wall Bumper	1270CXSV	626	TR
1 Ea	Gasketing	S88D 17’		NA

Hardware Group 8

Doors: 139 - (New exterior door)

3 Ea	Hinge	TA2714 4.5" x 4.5" NRP	626	MC
1 Ea	Cylindrical Lockset	10XG37 LL (Classroom)	626	SA
1 Ea	Core			ME
1 Ea	Closer	281-O (180 degree)	626	SA
1 Ea	Kick Plate	B4EKP 10" x 34" B4E CS	630	TI
1 Ea	Floor Stop	1214H	626	TR
1 Ea	Weatherstrip	2891AS (Head) x 290AS Jambs		PE
1 Ea	Door Sweep	315 CN		PE
1 Ea	Wall Bumper	1270CXSV		TR
1 Ea	Threshold	196A 193A 195A FHSL14		PE

Hardware Group 9

Doors: 121B - (New closet door)

3 Ea	Hinges	TA2714 4.5" x 4.5"	626	MC
1 Ea	Cylindrical Lockset	10XU15 LL (Passage)	626	SA
1 Ea	Wall Bumper	1270CXSV	626	TR

Hardware Group 11

Doors: 122B - (New entry door to include card access and security)

2 Ea	Hinge	T4A3786 4.5" x 4.5" NRP	626	MC
1 Ea	Electric Hinge	T4A3786 4.5" x 4.5" NRP CC8	626	MC
*1 Ea	Cylindrical Lockset	10XG71 LL (Electrified Entry Lock)	626	SA
1 Ea	Core			ME
1 Ea	Closer	281-O	626	SA
1 Ea	Kick Plate	B4EKP 10" x 34" B4E CS	630	TI
1 Ea	Pipe Stop / Holder	1209HOHA	626	TR
1 Ea	Weatherstrip	2891AS (Head) x 290AS Jambs		PE
1 Ea	Door Sweep	315 CN		PE
1 Ea	Saddle Threshold	2727A x 36" FHSL14		PE
*1 Ea	Power Supply	by security		
*1 Ea	Card reader	by security		

END OF SECTION 08 71 00

SECTION 08 80 00 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes:
   1. Glass products.
   2. Laminated glass.
   3. Insulating glass.
   4. Glazing sealants.
   5. Glazing tapes.
   6. Miscellaneous glazing materials.

1.3 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. IBC: International Building Code.

D. Interspace: Space between lites of an insulating-glass unit.

1.4 COORDINATION

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

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Meeting: Conduct preinstallation meeting as part of general construction meeting or separately as necessary.
   1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   2. Review temporary protection requirements for glazing during and after installation.

1.6 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 units.
   2. Tinted glass.
   3. Coated glass.
   4. Laminated glass.
   5. Insulating glass.

C. Glazing Accessory Samples: For sealants and colored spacers, in 12-inch lengths.

D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

E. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturers of insulating-glass units with sputter-coated, low-E coatings.

B. Product Certificates: For glass.

C. Product Test Reports: For insulating glass and glazing sealants, for tests performed by a qualified testing agency.
   1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.

D. Preconstruction adhesion and compatibility test report.

E. Sample Warranties: For special warranties.

1.8 QUALITY ASSURANCE

A. Fabricated-Glass Manufacturer Qualifications: A qualified manufacturer of fabricated glass units who is approved and certified by primary glass manufacturer.

B. Installer Qualifications: A qualified glazing contractor for this Project who is certified under the North American Contractor Certification Program (NACC) for Architectural Glass & Metal (AG&M).

C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

1.9 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
   1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.

2. Use ASTM C1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.

3. Test no fewer than four samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.

4. Schedule enough time for testing and analyzing results to prevent delaying the Work.

5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.

1.10 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.

1.11 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.

1.12 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

1. Warranty Period: 10 years from date of Substantial Completion.

B. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty Period: 10 years from date of Substantial Completion.

C. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.

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. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design glazing.

C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E 1300.

1. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.
    a. Wind Loads: Per IBC Section 1609 and ASCE 7 Chapters 26 thru 30, or, as indicated on Drawings.
    b. Ultimate Design Wind Speed: 115 mph.
    c. Risk Category: III
    d. Exposure Category: B.
2. Design Snow Loads: As indicated on Drawings.
3. Probability of Breakage for Sloped Glazing: For glass sloped more than 15 degrees from vertical, design glass for a probability of breakage not greater than 0.001.
4. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
5. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

D. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

E. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. For laminated-glass lites, properties are based on products of construction indicated.

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: "Laminated Glazing Reference Manual" and "Glazing Manual."

2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR A7, "Sloped Glazing Guidelines."

3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."

4. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

B. 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. Provide glass that complies with performance requirements and is not less than the thickness indicated.

1. Minimum Glass Thickness for Exterior Lites: 6 mm.

2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.

2.4 Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with performance requirements. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.5 GLASS PRODUCTS

A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.

B. Ultraclear Annealed Float Glass: ASTM C1036, Type I, Class I (clear), Quality-Q3; and with visible light transmission of not less than 91 percent and SHGC of not less than 0.87.

C. Tinted Annealed Float Glass: ASTM C1036, Type I, Class 2 (tinted), Quality-Q3.

D. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

E. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

F. Pyrolytic-Coated, Low-Maintenance Glass: Clear float glass with coating on first surface having both photocatalytic and hydrophilic properties that act to loosen dirt and to cause water to sheet evenly over the glass instead of beading.

G. Reflective- and Low-E-Coated Vision Glass: ASTM C1376.

H. Ceramic-Coated Vision Glass: ASTM C1048, Condition C, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3; and complying with Specification No. 95-1-31 in NGA's "Engineering Standards Manual."

2.6 LAMINATED GLASS

A. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

1. Construction: Laminate glass with polyvinyl butyral interlayer ionomeric polymer interlayer or cast-in-place and cured-transparent-resin interlayer to comply with interlayer manufacturer's written instructions.

2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.

3. Interlayer Color: Clear unless otherwise indicated, for insulated laminated safety glass ("ILE-1-S" and "ILE-2-S" as indicated on window schedules, sheets A3.03 and A4.01).

2.7 INSULATING GLASS

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

1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.

2. Perimeter Spacer: Manufacturer's standard spacer material and construction.

3. Desiccant: Molecular sieve or silica gel, or a blend of both.

4. Provide Laminated glass lites where safety glass is indicated.

2.8 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 of industry colors.

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

2.9 GLAZING TAPES

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

1. AAMA 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.

2.10 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.11 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

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 in writing by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of

removable stops. Start gasket applications at corners and work toward centers of openings.

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

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 CLEANING AND PROTECTION

A. Immediately after installation remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.8 MONOLITHIC GLASS SCHEDULE

A. Glass Type: Clear float glass.
   1. Minimum Thickness: 6 mm.
   2. Safety glazing required.

3.9 LAMINATED GLASS SCHEDULE

A. Glass Type: Clear laminated glass with two plies of annealed float glass.

   1. Minimum Thickness of Each Glass Ply: 3 mm.
   2. Interlayer Thickness: 0.030 inch.
   3. Safety glazing required.

3.10 INSULATING GLASS SCHEDULE

3.11 INSULATING-LAMINATED-GLASS SCHEDULE

A. Glass Type: **ILE-1**: Insulated Low – E for standard exposure. (Double Glazed Clear Solar Control Insulating Glass Unit), *Solarban 70XL - 6 mm (2) | Argon 1/2" (12.7 mm) | 6 mm Clear.
   1. Overall Unit Thickness: 1-1/16 inch.
   2. Conformance: ASTM E 2190
   3. Outdoor Lite: Clear Float Glass
      a. Conformance: ASTM C 1036, Type 1, Class 1, Quality Q3.
      b. Glass Thickness: 6 mm (1/4")
      c. Magnetic Sputter Vacuum Deposition Coating (MSVD): ASTM C 1376.
      d. Coating: *Solarban 70XL on Surface # 2
      e. Heat-Treatment: Heat-strengthened, ASTM C 1048, Kind HS
   4. Interspace Content: Argon 1/2" (12.7 mm)
   5. Indoor Lite: Clear Float Glass
      a. Conformance: ASTM C 1036, Type 1, Class 1, Quality Q3.
      b. Glass Thickness: 6 mm (1/4")
      c. Heat-Treatment: Heat-strengthened, ASTM C 1048, Kind HS
   6. Minimum Performance Requirements:
      a. Visible Light Transmittance: 64 percent minimum
      b. Winter Nighttime U-Factor: 0.28 (Btu/hr.*ft2*°F) maximum.
      c. Summer daytime U-Factor: 0.26 (Btu/hr.*ft2*°F) maximum.
      d. Shading Coefficient: 0.31 maximum.
      e. Solar Heat Gain Coefficient: 0.27 maximum.
      f. Outdoor Visible Light Reflectance: 12 percent maximum.

7. * Basis of design.
    a. Low E Coating on Surface 2: Solarban 70XL by Vitro Architectural Glass or equivalent upon approval.

B. Glass Type: **ILE-1S**: Insulated Low – E for standard exposure designated as safety or security glazing. (Double Glazed Clear Solar Control Laminated Insulating Glass Unit),[*Solarban 70XL - 6 mm (2) | Argon 1/2" (12.7 mm) | 3 mm Clear, 060 PVB, 3 mm Clear
1. Overall Unit Thickness: 1-1/16 inch.
2. Conformance: ASTM E 2190
3. Outdoor Lite: Clear Float Glass
    a. Conformance: ASTM C 1036, Type 1, Class 1, Quality Q3.
    b. Glass Thickness: 6 mm (1/4")
    c. Magnetic Sputter Vacuum Deposition Coating (MSVD): ASTM C 1376.
    d. Coating: *Solarban 70XL on Surface # 2
    e. Heat-Treatment: Heat-strengthened, ASTM C 1048, Kind HS
4. Interspace Content: Argon 1/2" (12.7 mm)
5. Indoor Lite: Laminated
    a. Conformance: ASTM C1172 and complying with testing requirements.
    5.1. Laminate Outboard Lite: Clear float glass.
        a. Conformance: ASTM C 1036, Type I, Class 1, Quality Q3
        b. Thickness: 3 mm (1/8")
        c. Heat-Treatment: Heat-strengthened, ASTM C 1048, Kind HS
    5.2. Interlayer:
        a. Type: PVB
        b. Thickness: 0.060" (1.52 mm)
        c. Color: Clear
    5.3. Laminate Inboard Lite: Clear float glass.
        a. Conformance: ASTM C 1036, Type I, Class 1, Quality q3
        b. Thickness: 3 mm (1/8")
        c. Heat-Treatment: Heat-strengthened, ASTM C 1048, Kind HS.
6. Minimum Performance Requirements:
    a. Visible Light Transmittance: 64 percent minimum
    b. Winter Nighttime U-Factor: 0.28 (Btu/hr.*ft2*°F) maximum.
    c. Summer daytime U-Factor: 0.26 (Btu/hr.*ft2*°F) maximum.
    d. Shading Coefficient: 0.31 maximum.
    e. Solar Heat Gain Coefficient: 0.27 maximum.
    f. Outdoor Visible Light Reflectance: 12 percent maximum.
7. * Basis of design.
    b. Low E Coating on Surface 2: Solarban 70XL by Vitro Architectural Glass or equivalent upon approval.

END OF SECTION 08 80 00

SECTION 08 91 19 - FIXED LOUVERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Fixed formed metal louvers.

B. Related Requirements:
1. Section 079200 "Joint Sealants" for perimeter joints between louvers and construction.
2. Section 099113 "Exterior Painting" for field painting exterior louvers.
3. Section 099123 "Interior Painting" for field painting interior louvers.

1.3 DEFINITIONS

A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.

B. Horizontal Louver: Louver with horizontal blades (i.e., the axis of the blades are horizontal).

C. Vertical Louver: Louver with vertical blades (i.e., the axis of the blades are vertical).

D. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

E. Wind-Driven-Rain-Resistant Louver: Louver that provides specified wind-driven-rain performance, as determined by testing according to AMCA 500-L.

F. Windborne-Debris-Impact-Resistant Louver: Louver that provides specified windborne-debris-impact resistance, as determined by testing according to AMCA 540.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.

1. Show weep paths, gaskets, flashings, sealants, and other means of preventing water intrusion.
2. Show mullion profiles and locations.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.

1. Show weep paths, gaskets, flashings, sealants, and other means of preventing water intrusion.
2. Show mullion profiles and locations.

1.6 INFORMATIONAL SUBMITTALS

A. Sample Warranties: For manufacturer's special warranties.

1.7 QUALITY ASSURANCE

A. Source Limitations: Obtain louvers and vents through one source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.2/D1.2M.
2. AWS D1.3/D1.3M.
3. AWS D1.6/D1.6M.

1.8 FIELD CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.9 WARRANTY

A. Special Finish Warranty: Manufacturer agrees to repair or replace components on which finishes fail in materials or workmanship within specified warranty period.

1. Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain fixed louvers from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

2.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver-blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act normal to the face of the building.

1. Wind Loads: Determine loads based on pressures as indicated on Drawings.

B. Windborne-Debris-Impact Resistance: Louvers located within 30 feet of grade shall pass basic protection, when tested according to AMCA 540.

C. Seismic Performance: Louvers, including attachments to other construction, shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
1. Component Importance Factor: 1.0.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

E. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

2.3 FIXED FORMED-METAL LOUVERS

A. Horizontal Drainable-Blade Louver:

1. Louver Depth: 6 inches.
2. Frame and Blade Material and Nominal Thickness: Galvanized-steel sheet, not less than 0.064 inch.
3. Mullion Type: Exposed.
4. Louver Performance Ratings:

a. Free Area: Not less than 7.5 sq. ft for 48-inch-wide by 48-inch-high louver.

b. Point of Beginning Water Penetration: Not less than 900 fpm.
c. Air Performance: Not more than 0.15-inch wg 900-fpm free-area velocity.

5. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.4 LOUVER SCREENS

A. General: Provide screen at each exterior louver.

1. Screen Location for Fixed Louvers: Interior face.
2. Screening Type: Insect screening.

B. Secure screen frames to louver frames with machine screws with heads finished to match louver, spaced a maximum of 6 inches from each corner and at 12 inches o.c.

C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.

1. Metal: Same type and form of metal as indicated for louver to which screens are attached.
2. Finish: Same finish as louver frames to which louver screens are attached.
3. Type: Rewirable frames with a driven spline or insert.

D. Louver Screening for Galvanized-Steel Louvers:
1. Insect Screening: Galvanized steel, 18-by-14 mesh, 0.011-inch wire.

2.5 MATERIALS

A. Galvanized-Steel Sheet: ASTM A 653/A 653M, [G60] [G90] zinc coating, mill phosphatized.

B. Fasteners: Use types and sizes to suit unit installation conditions.

1. Use Phillips flat-head screws for exposed fasteners unless otherwise indicated.
2. For fastening galvanized steel, use hot-dip-galvanized-steel or 300 series stainless-steel fasteners.
3. For color-finished louvers, use fasteners with heads that match color of louvers.

C. Factory assemble louvers to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

D. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.

1. Frame Type: Channel unless otherwise indicated.

E. Include supports, anchorages, and accessories required for complete assembly.

1. Exposed Mullions: Where indicated, provide units with exposed mullions of same width and depth as louver frame. Where length of louver exceeds fabrication and

handling limitations, provide interlocking split mullions designed to permit expansion and contraction.

F. Join frame members to each other and to fixed louver blades with fillet welds, threaded fasteners, or both, as standard with louver manufacturer unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.6 GALVANIZED-STEEL SHEET FINISHES

A. Finish louvers after assembly.

B. Surface Preparation: Clean surfaces with nonpetroleum solvent, so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating compatible with the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas and repair according to ASTM A 780/A 780M.

C. Baked-Enamel or Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, with a minimum dry film thickness of 2 mils.

1. Color and Gloss: As indicated by manufacturer's designations. As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

C. Form closely fitted joints with exposed connections accurately located and secured.

D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

E. Protect unpainted galvanized- and nonferrous-metal surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.

F. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Section 07 92 00 "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

A. Clean exposed louver surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.

B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

C. Restore louvers damaged during installation and construction, so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 08 91 19

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Interior gypsum board.

B. Related Requirements:

1. Section 06 16 00 "Sheathing" for gypsum sheathing for exterior walls.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Gypsum wallboard.
2. Gypsum board, Type X.
3. Gypsum ceiling board.
4. Gypsum board, Type C.
5. Glass-mat interior gypsum board.
6. Skim-coated gypsum board.
7. Glass-mat gypsum sheathing board.
8. Glass-mat, water-resistant backing board.
9. Cementitious backer units.
10. Water-resistant gypsum backing board.
11. Interior trim.
12. Exterior trim.
13. Joint treatment materials.
14. Laminating adhesive.
15. Sound-attenuation blankets.
16. Acoustical sealant.

B. Samples: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch-long length for each trim accessory indicated.
2. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on same backing indicated for Work.

C. Samples for Initial Selection: For each type of trim accessory and textured finish indicated.

D. Samples for Verification: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch-long length for each trim accessory indicated.
2. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on same backing indicated for Work.

1.4 QUALITY ASSURANCE

A. Mockups: Build mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Build mockups for the following:

a. Each level of gypsum board finish indicated for use in exposed locations.
b. Each texture finish indicated.

2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
3. Simulate finished lighting conditions for review of mockups.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM 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.

2.2 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

A. Gypsum Wallboard: ASTM C1396/C1396M.
   1. Thickness: 1/2 inch.
   2. Long Edges: Tapered for prefilling.

B. Gypsum Board, Type X: ASTM C1396/C1396M.
   1. Thickness: 5/8 inch.
   2. Long Edges: Tapered for prefilling.

C. Gypsum Ceiling Board: ASTM C1396/C1396M.
   1. Thickness: 1/2 inch.
   2. Long Edges: Tapered.

2.4 SPECIALTY GYPSUM BOARD

A. Gypsum Board, Type C: ASTM C1396/C1396M. Manufactured to have increased fire-resistive capability.
   1. Thickness: As required by fire-resistance-rated assembly indicated on Drawings.
   2. Long Edges: Tapered.

B. Glass-Mat Interior Gypsum Board: ASTM C1658/C1658M. With fiberglass mat laminated to both sides. Specifically designed for interior use.
   1. Core: As indicated.
   2. Long Edges: Tapered.
   3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

C. Skim-Coated Gypsum Board: ASTM C1396/C1396M. Manufactured with a factory-applied skim coat.
   1. Core: As indicated.
   2. Long Edges: Tapered.

2.5 TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Board: ASTM C1178/C1178M, with manufacturer's standard edges.
   1. Core: As indicated on Drawings.
   2. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

B. Cementitious Backer Units: ANSI A118.9 and ASTM C1288 or ASTM C1325, with manufacturer's standard edges.
   1. Thickness: As indicated.
   2. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

C. Water-Resistant Gypsum Backing Board: ASTM C1396/C1396M, with manufacturer's standard edges.
   1. Core: As indicated on Drawings.

2.6 TRIM ACCESSORIES

A. Interior Trim: ASTM C1047.

   1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.
   2. Shapes:

      a. Cornerbead.
      b. Bullnose bead.
      c. LC-Bead: J-shaped; exposed long flange receives joint compound.
      d. L-Bead: L-shaped; exposed long flange receives joint compound.
      e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
      f. Expansion (control) joint.
      g. Curved-Edge Cornerbead: With notched or flexible flanges.
      h. Base-of-Wall Galvanized Moisture Barrier Trim: Galvanized-steel sheet, 2 inches high.

      i. Base-of-Wall PVC Moisture Barrier Trim: Extruded PVC, height as indicated on drawings or, at minimum 1-3/4 inch high.

B. Exterior Trim: ASTM C1047.

   1. Material: Hot-dip galvanized-steel sheet, plastic, or rolled zinc.
   2. Shapes:

      a. Cornerbead.
      b. LC-Bead: J-shaped; exposed long flange receives joint compound.
      c. Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening.

2.7 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C475/C475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Exterior Gypsum Soffit Board: Paper.
3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
4. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints**,** beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.

    a. Use setting-type compound for installing paper-faced metal trim accessories.

3. Fill Coat: For second coat, use setting-type, sandable topping compound.
4. Finish Coat: For third coat, use setting-type, sandable topping compound.
5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.

D. Joint Compound for Exterior Applications:

1. Exterior Gypsum Soffit Board: Use setting-type taping compound and setting-type, sandable topping compound.
2. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.

E. Joint Compound for Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
2. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.8 AUXILIARY MATERIALS

A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

C. 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.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. 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.

E. Acoustical Sealant: As specified in Section 07 92 19 "Acoustical Joint Sealants."

F. Thermal Insulation: As specified in Section 07 21 00 "Thermal Insulation."

G. Vapor Retarder: As specified in Section 07 26 00 "Vapor Retarders."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 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. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. 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.

J. 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.

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. Wallboard Type: As indicated on Drawings.
2. Type X: As indicated on Drawings.
3. Ceiling Type: As indicated on Drawings.
4. Type C: As indicated on Drawings.
5. Glass-Mat Interior Type: As indicated on Drawings.
6. Skim-Coated 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 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. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.

3.4 INSTALLATION OF EXTERIOR GYPSUM PANELS FOR CEILINGS AND SOFFITS

A. Apply panels perpendicular to supports, with end joints staggered and located over supports.

1. Install with 1/4-inch open space where panels abut other construction or structural penetrations.
2. Fasten with corrosion-resistant screws.

3.5 INSTALLATION OF TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install where indicated including locations indicated to receive tile. Install with 1/4-inch gap where panels abut other construction or penetrations.

B. Cementitious Backer Units: ANSI A108.11, at [showers, tubs, and where indicated] [locations indicated to receive tile].

C. Water-Resistant Backing Board: Install where indicated with 1/4-inch gap where panels abut other construction or penetrations.

D. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.6 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.

B. Control Joints: Install control joints [at locations indicated on Drawings] [according to ASTM C840 and in specific locations approved by Architect for visual effect].

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners unless otherwise indicated.
2. Bullnose Bead: Use at outside corners where indicated.
3. LC-Bead: Use at exposed panel edges.
4. L-Bead: Use where indicated.
5. U-Bead: Use at exposed panel edges where indicated.
6. Curved-Edge Cornerbead: Use at curved openings.

D. Exterior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners.
2. LC-Bead: Use at exposed panel edges.

E. Aluminum Trim: Install in locations indicated on Drawings.

3.7 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: Panels that are substrate for tile, Panels that are substrate for acoustical tile where indicated on Drawings.
3. Level 3: Where indicated on Drawings.
4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.

    a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."

5. Level 5: Where indicated on Drawings.

    a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."

E. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.

F. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.

G. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.8 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 29 00

SECTION 09 51 13 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.2 SUMMARY

A. Section includes acoustical panels and exposed suspension systems for interior ceilings.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Meeting: Conduct preinstallation meeting as part of general construction meeting or separately as necessary.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified, 6 inches in size.

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.
3. Clips: Full-size hold-down, impact and seismic clips.

C. Delegated-Design Submittal: For seismic restraints for ceiling systems.

1. Include design calculations for seismic restraints including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

1. Ceiling suspension system members.
2. Method of attaching hangers to building structure.
3. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
4. Size and location of initial access modules for acoustical panels.
5. Items penetrating finished ceiling and ceiling-mounted items including the following:

a. Lighting fixtures.
b. Diffusers.
c. Grilles.
d. Speakers.
e. Sprinklers.
f. Access panels.
g. Perimeter moldings.

6. Minimum Drawing Scale: 1/8 inch = 1 foot.

B. Qualification Data: For testing agency.

C. Product Test Reports: For each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency.

D. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.

E. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

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

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size panels equal to 10 percent of quantity installed.
2. Suspension-System Components: Quantity of each exposed component equal to 10 percent of quantity installed.
3. Hold-Down Clips: Equal to 10 percent of quantity installed.
4. Impact Clips: Equal to 10 percent of quantity installed.

1.8 DELIVERY, STORAGE, AND HANDLING

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

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.9 FIELD CONDITIONS

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

1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Suspended ceilings shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: Class A according to ASTM E 1264.
2. Smoke-Developed Index: 50 or less.

2.3 ACOUSTICAL PANELS

A. Manufacturers: Subject to compliance with requirements, provide products by the following or equal:

1. Armstrong World Industries, Inc. Fine fissured, square edge.
2. USG Corporation. Radar Open Plan, square edge.

Match existing adjacent ceiling panels.

B. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E 1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

C. Classification: Provide fire-resistance-rated panels as follows:

1. Type and Form: Type III, mineral base with painted finish; Form 2, water felted.
2. Pattern: Fine textured pattern.

D. Color: White.

E. Light Reflectance (LR): Not less than 0.86.

F. Ceiling Attenuation Class (CAC): Not less than 35.

G. Noise Reduction Coefficient (NRC): Not less than 0.85.

H. Edge/Joint Detail: Square.

I. Thickness: Min 5/8 per manufacturer.

J. Modular Size: 24 by 48 inches or as shown on the drawings.

K. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273, ASTM D 3274, or ASTM G 21 and evaluated according to ASTM D 3274 or ASTM G 21.

2.4 METAL SUSPENSION SYSTEM

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Armstrong World Industries, Inc.
2. Chicago Metallic Corporation.
3. USG Corporation.

B. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C 635/C 635M and designated by type, structural classification, and finish indicated.

1. High-Humidity Finish: Where indicated, provide coating tested and classified for "severe environment performance" according to ASTM C635/C635M.

C. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished 15/16-inch-wide metal caps on flanges.

1. Structural Classification: Heavy-duty system.
2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
3. Face Design: Flat, flush.
4. Cap Material: Cold-rolled steel.
5. Cap Finish: Painted in color as selected from manufacturer's full range.

2.5 ACCESSORIES

A. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

B. Wire Hangers, Braces, and Ties: Provide wires as follows:

1. Stainless-Steel Wire: ASTM A 580/A 580M, Type 304, nonmagnetic.
2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.106-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.

F. Seismic Clips: Manufacturer's standard seismic clips designed to secure acoustical panels in place during a seismic event.

G. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces.

H. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.

2.6 METAL EDGE MOLDINGS AND TRIM

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Armstrong World Industries, Inc.
2. Chicago Metallic Corporation.
3. USG Corporation.
4. BPB USA.

B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

1. Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

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

B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION

A. Install acoustical panel ceilings according to ASTM C 636/C 636M, seismic design requirements, and manufacturer's written instructions.

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.

2. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, counter-splaying, or other equally effective means.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
8. Do not attach hangers to steel deck tabs.
9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

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. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.
3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

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. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.

2. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
3. For reveal-edged panels on suspension-system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension-system surfaces and panel faces flush with bottom face of runners.
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.
5. Install hold-down, impact or seismic clips in areas indicated; space according to panel manufacturer's written instructions unless otherwise indicated.
    a. Hold-Down Clips: Space 24 inches o.c. on all cross runners.
6. Install clean-room gasket system in areas indicated, sealing each panel and fixture as recommended by panel manufacturer's written instructions.
7. Protect lighting fixtures and air ducts according to requirements indicated for fire-resistance-rated assembly.
8. Within each test area, testing agency will select one of every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them for 200 lbf of tension; it will also select one of every two postinstalled anchors used to attach bracing wires to concrete and will test them for 440 lbf of tension.

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.

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 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 13

SECTION 09 65 13 - RESILIENT BASE AND ACCESSORIES

Note this section added for **prep work only** – Final installation by others

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Thermoset-rubber base.
   2. Rubber molding accessories.
   3. Vinyl molding accessories.

1.3 OWNER

A. **The Owner will contract for the supply and installation of all rubber tile flooring and resilient wall base and accessories under a separate contract**. The General Contractor shall prepare all surfaces to an acceptable condition for installation. The floor and wall shall be void of ridges, waves and irregularities and shall be dry, clean and free of foreign matter, suitable for the tile carpeting and base.

1.4 GENERAL CONTRACTOR

A. **The General Contractor shall coordinate rubber tile flooring and resilient wall base and accessories installation with the Owner's supplier/installer (flooring contractor).** The time for installation shall be included in the Contractor's CPM schedule. Installation must be completed before the date of substantial completion. The General Contractor shall allow access to the building as required by the tile carpeting and resilient wall base and accessories contractor.

1.5 GENERAL SCOPE OF WORK

A. **Contractor is not responsible** for submittals, product descriptions, installation, etc. as outlined in the following sections. Sections are included for contractor reference. **Contractor is responsible** for all preparation work and for coordinating with others to facilitate completion of their work as outlined in this section.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified, not less than 12 inches long.

C. Product Schedule: For resilient base and accessory products.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. 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.

1.8 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.

1.9 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.
   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 PERFORMANCE REQUIREMENTS

2.2 THERMOSET-RUBBER BASE.

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Burke Mercer Flooring Products; a division of Burke Industries Inc.
   2. Flexco.
   3. Johnsonite; a Tarkett company.
   4. Roppe Corporation, USA.

B. Product Standard: ASTM F 1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).
   1. Style and Location:
      a. Style B, Cove.

C. Thickness: 0.125 inch.

D. Height: 6 inches.

E. Lengths: Coils in manufacturer's standard length.

F. Outside Corners: Job formed or preformed.

G. Inside Corners: Job formed or preformed.

H. Colors: Match Architect's sample.

2.3 RUBBER MOLDING ACCESSORY.

A. Description: Rubber reducer strip for floor covering and transition strips.

B. Locations: Provide rubber molding accessories in areas as required.

C. Colors and Patterns: Match Architect's sample.

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.

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.

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.

I. Miter or cope corners to minimize open joints

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient 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.

D. Floor Polish: Remove soil, adhesive, and blemishes from resilient stair treads before applying liquid floor polish.

1. Apply number of coats as recommended per manufacturer but not less than one.

E. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 09 65 13

SECTION 09 65 16 - RESILIENT SHEET FLOORING

Note this section added for **prep work only** – Final installation by others

PART 1 - GENERAL

1.1 OWNER

A. **The Owner will contract for the supply and installation of all resilient sheet flooring under a separate contract.** The General Contractor shall provide concrete slabs steel troweled to a smooth surface. The floor shall be void of ridges, waves and irregularities and shall be dry, clean, and free of foreign matter, suitable for resilient sheet flooring installation. Coordinate repair and prep-work for installation of resilient sheet flooring with the Owner's supplier/installer (resilient sheet flooring contractor).

1.2 GENERAL CONTRACTOR

A. **The General Contractor shall coordinate resilient sheet flooring installation with the Owner's supplier/installer (resilient sheet flooring contractor).** The time for resilient sheet flooring installation shall be included in the Contractor's CPM schedule. Installation must be completed before the date of substantial completion. The General Contractor shall allow access to the building as required by the resilient sheet flooring contractor.

1.3 ACCESSORIES

A. Rubber base and reducer strips between carpet and other floor finishes are to be furnished and installed under a separate contract.

1.4 GENERAL SCOPE OF WORK

A. **Contractor is not responsible for submittals, product descriptions, installation, etc. as outlined in the following sections.** Sections are included for contractor reference. Contractor is responsible for all preparation work and for coordinating with others to facilitate completion of their work as outlined in this section.

1.5 RELATED DOCUMENTS

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

1.6 SUMMARY

A. Section Includes:

1. Resilient Sheet Flooring
2. Adhesives and accessories required for installation, maintenance and repair.

B. Related Sections:

1. Section 033000 - Cast-In-Place Concrete
2. Section 035400 - Cementitious Underlayment

3. Section 092900 - Gypsum Board

1.7 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 each exposed product and for each color, texture, and pattern specified, in manufacturer's standard size, but not less than 6-by-9-inch sections.

1. For heat-welding bead, manufacturer's standard-size Samples, but not less than 9 inches long, of each color required.

D. Samples for Initial Selection: For each type of resilient sheet flooring indicated.

E. 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.

F. Product Schedule: For resilient sheet flooring

1.8 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.9 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of resilient sheet flooring to include in maintenance manuals.

1.10 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 in roll form and in full roll width for each type, color, and pattern of flooring installed.

1.11 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.

2. Documented experience of 3 commercial quality vinyl flooring installations within last three years of comparable scope.

1.12 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.

1.13 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 59 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 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For resilient sheet flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 VINYL SHEET FLOORING WITH BACKING

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Mondo Contract Flooring: Rubber Sheet Flooring, Harmoni.

B. Product Standard: ASTM F 1303.

1. Slip resistance. ASTM D2047, $\geq$ 0.80
2. Overall Thickness: 0.118.

C. Sheet Width: 6’-2” feet.

D. Seamless-Installation Method: Heat welded.

E. Colors and Patterns: Match Architect's samples.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient sheet flooring manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by flooring and adhesive manufacturers to suit resilient sheet flooring and substrate conditions indicated.

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.

D. Integral-Flash-Cove-Base Accessories:

1. Cove Strip: 1-inch radius provided or approved by resilient sheet flooring manufacturer.
2. Cap Strip: Tapered vinyl cap provided or approved by resilient sheet flooring manufacturer.
3. Corners: Metal inside and outside corners and end stops provided or approved by resilient sheet flooring manufacturer.

E. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient sheet flooring 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 resilient sheet flooring.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 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 F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by resilient sheet flooring manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by resilient sheet flooring manufacturer. Proceed with installation only after substrate alkalinity falls

within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.

4. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft, and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

   a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft in 24 hours.
   b. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

C. 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.

3.3 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 F 1516. 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.

J. Integral-Flash-Cove Base: Cove resilient sheet flooring 6 inches up vertical surfaces. Support flooring at horizontal and vertical junction with cove strip. Butt at top against cap strip.

1. Install metal corners at inside and outside corners.

3.4 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 09 65 16

SECTION 09 65 19 - RESILIENT TILE FLOORING

Note this section added for **prep work only** – Final installation by others

PART 1 - GENERAL

1.1 OWNER

A. **The Owner will contract for the supply and installation of all resilient tile flooring under a separate contract.** The General Contractor shall provide concrete slabs steel troweled to a smooth surface. The floor shall be void of ridges, waves and irregularities and shall be dry, clean, and free of foreign matter, suitable for resilient tile flooring installation. Coordinate repair and prep-work for installation of resilient tile flooring with the Owner's supplier/installer (resilient tile flooring contractor).

1.2 GENERAL CONTRACTOR

A. **The General Contractor shall coordinate resilient tile flooring installation with the Owner's supplier/installer (resilient tile flooring contractor).** The time for resilient tile flooring installation shall be included in the Contractor's CPM schedule. Installation must be completed before the date of substantial completion. The General Contractor shall allow access to the building as required by the resilient tile flooring contractor.

1.3 ACCESSORIES

A. Rubber base and reducer strips between carpet and other floor finishes are to be furnished and installed under a separate contract.

1.4 GENERAL SCOPE OF WORK

A. **Contractor is not responsible for submittals, product descriptions, installation, etc. as outlined in the following sections.** Sections are included for contractor reference. Contractor is responsible for all preparation work and for coordinating with others to facilitate completion of their work as outlined in this section.

1.5 RELATED DOCUMENTS

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

1.6 SUMMARY

A. Section Includes:

1. Vinyl composition floor tile.

1.7 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: Full-size units of each color, texture, and pattern of floor tile required.
1. For heat-welding bead, manufacturer's standard-size Samples, but not less than 9 inches long, of each color required.

D. Samples for Initial Selection: For each type of floor tile indicated.

E. Samples for Verification: Full-size units of each color and pattern of floor tile required.
1. For heat-welding bead, manufacturer's standard-size Samples, but not less than 9 inches long, of each color required.

F. Welded-Seam Samples: For seamless-installation technique indicated and for each floor covering product, color, and pattern required; with seam running lengthwise and in center of [6-by-9-inch] <Insert dimensions> Sample applied to a rigid backing and prepared by Installer for this Project.

G. Product Schedule: For floor tile. Use same designations indicated on Drawings.

1.8 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.9 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.10 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. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.11 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.

1.12 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.

1.13 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg For 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. 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 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For resilient floor tile, 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.

2.2 VINYL COMPOSITION FLOOR TILE

A. Tile Standard: ASTM F1066, Class 3, surface pattern.

B. Wearing Surface: Smooth.

C. Thickness: 0.125 inch.

D. Size: 12 by 12 inches.

E. Colors and Patterns: Match Architect's samples.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by 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 indicated.

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 floor tile.

2. Chemical-Bonding Compound: Manufacturer's product for chemically bonding seams.

D. 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 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.
3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
4. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

    a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb. of water/1000 sq. ft. in 24 hours.
    b. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

C. Access Flooring Panels: Remove protective film of oil or other coating using method recommended by access flooring manufacturer.

D. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

E. 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.

F. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tiles square with room axis.

C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles with grain running in one direction.

D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in 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.

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.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.

B. Perform the following operations immediately after completing floor tile installation:

1. Remove adhesive and other blemishes from 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: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.

1. Apply three coats.

E. Cover floor tile until Substantial Completion.

END OF SECTION 09 65 19

SECTION 09 65 19 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 OWNER

A. **The Owner will contract for the supply and installation of all resilient tile flooring under a separate contract.** The General Contractor shall provide concrete slabs steel troweled to a smooth surface. The floor shall be void of ridges, waves and irregularities and shall be dry, clean, and free of foreign matter, suitable for resilient tile flooring installation. Coordinate repair and prep-work for installation of resilient tile flooring with the Owner's supplier/installer (resilient tile flooring contractor).

1.2 GENERAL CONTRACTOR

A. **The General Contractor shall coordinate resilient tile flooring installation with the Owner's supplier/installer (resilient tile flooring contractor).** The time for resilient tile flooring installation shall be included in the Contractor's CPM schedule. Installation must be completed before the date of substantial completion. The General Contractor shall allow access to the building as required by the resilient tile flooring contractor.

1.3 ACCESSORIES

A. Rubber base and reducer strips between carpet and other floor finishes are to be furnished and installed under a separate contract.

1.4 GENERAL SCOPE OF WORK

A. **Contractor is not responsible for submittals, product descriptions, installation, etc. as outlined in the following sections.** Sections are included for contractor reference. Contractor is responsible for all preparation work and for coordinating with others to facilitate completion of their work as outlined in this section.

1.5 RELATED DOCUMENTS

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

1.6 SUMMARY

A. Section Includes:
   1. Vinyl composition floor tile.

1.7 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: Full-size units of each color, texture, and pattern of floor tile required.

1. For heat-welding bead, manufacturer's standard-size Samples, but not less than 9 inches long, of each color required.

D. Samples for Initial Selection: For each type of floor tile indicated.

E. Samples for Verification: Full-size units of each color and pattern of floor tile required.

1. For heat-welding bead, manufacturer's standard-size Samples, but not less than 9 inches long, of each color required.

F. Welded-Seam Samples: For seamless-installation technique indicated and for each floor covering product, color, and pattern required; with seam running lengthwise and in center of [6-by-9-inch] <Insert dimensions> Sample applied to a rigid backing and prepared by Installer for this Project.

G. Product Schedule: For floor tile. Use same designations indicated on Drawings.

1.8 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.9 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.10 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. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.11 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.

1.12 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.

1.13 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg For 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. 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 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For resilient floor tile, 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.

2.2 VINYL COMPOSITION FLOOR TILE

A. Tile Standard: ASTM F1066, Class 3, surface pattern.

B. Wearing Surface: Smooth.

C. Thickness: 0.125 inch.

D. Size: 12 by 12 inches.

E. Colors and Patterns: Match Architect's samples.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by 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 indicated.

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 floor tile.

2. Chemical-Bonding Compound: Manufacturer's product for chemically bonding seams.

D. 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 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.
3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
4. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb. of water/1000 sq. ft. in 24 hours.
b. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

C. Access Flooring Panels: Remove protective film of oil or other coating using method recommended by access flooring manufacturer.

D. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

E. 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.

F. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tiles square with room axis.

C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles with grain running in one direction.

D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in 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.

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.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.

B. Perform the following operations immediately after completing floor tile installation:

1. Remove adhesive and other blemishes from 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: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.

1. Apply three coats.

E. Cover floor tile until Substantial Completion.

END OF SECTION 09 65 19

SECTION 09 68 16 - SHEET CARPETING

Note this section added for **prep work only** – Final installation by others

PART 1 - GENERAL

1.1 OWNER

A. **The Owner will contract for the supply and installation of all carpeting under a separate contract.** The General Contractor shall provide concrete slabs steel troweled to a smooth surface. The floor shall be void of ridges, waves and irregularities and shall be dry, clean, and free of foreign matter, suitable for carpet installation. Coordinate repair and prep-work for installation of carpet with the Owner's supplier/installer (carpeting contractor).

1.2 GENERAL CONTRACTOR

A. **The General Contractor shall coordinate carpet installation with the Owner's supplier/installer (carpeting contractor).** The time for carpet installation shall be included in the Contractor's CPM schedule. Installation must be completed before the date of substantial completion. The General Contractor shall allow access to the building as required by the carpeting contractor.

1.3 ACCESSORIES

A. Rubber base and reducer strips between carpet and other floor finishes are to be furnished and installed under a separate contract.

1.4 GENERAL SCOPE OF WORK

A. **Contractor is not responsible for submittals, product descriptions, installation, etc. as outlined in the following sections.** Sections are included for contractor reference. Contractor is responsible for all preparation work and for coordinating with others to facilitate completion of their work as outlined in this section.

1.5 RELATED DOCUMENTS

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

1.6 SUMMARY

A. Section Includes:

1. Tufted carpet.
2. Woven carpet.
3. Carpet cushion.

B. Related Requirements:

1. Section 02 41 19 "Selective Demolition" for removing existing floor coverings.

2. Section 09 65 13 "Resilient Base and Accessories for resilient wall base and accessories installed with carpet.

1.7 PREINSTALLATION MEETINGS

A. Preinstallation Meeting: Conduct preinstallation meeting as part of general construction meeting or separately as necessary.

1. Review methods and procedures related to carpet installation including, but not limited to, the following:

a. Review delivery, storage, and handling procedures.
b. Review ambient conditions and ventilation procedures.
c. Review subfloor preparation procedures.

1.8 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
2. Include manufacturer's written installation recommendations for each type of substrate.

B. Shop Drawings: For carpet installation, plans showing the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet.
2. Carpet type, color, and dye lot.
3. Locations where dye lot changes occur.
4. Seam locations, types, and methods.
5. Type of subfloor.
6. Type of installation.
7. Pattern type, repeat size, location, direction, and starting point.
8. Pile direction.
9. Types, colors, and locations of insets and borders.
10. Types, colors, and locations of edge, transition, and other accessory strips.
11. Transition details to other flooring materials.
12. Type of carpet cushion.

C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet: 12” square Sample.
2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch-long Samples.
3. Carpet Cushion: 6-inch- square Sample.
4. Carpet Seam: 6-inch Sample.
5. Mitered Carpet-Border Seam: 12-inch square Sample. Show carpet pattern alignment.

D. Samples for Initial Selection: For each type of carpet.

1. Include Samples of exposed edge, transition, and other accessory stripping involving color or finish selection.

E. Samples for Verification: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet: 12-inch square Sample.
2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch long Samples.
3. Carpet Cushion: 6-inch square Sample.
4. Carpet Seam: 6-inch Sample.
5. Mitered Carpet-Border Seam: 12-inch square Sample. Show carpet pattern alignment.

F. Product Schedule: For carpet and carpet cushion. Use same designations indicated on Drawings.

G. Sustainable Product Certification: Provide ANSI/NSF 140 certification for carpet products.

1.9 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For carpet and carpet cushion, for tests performed by a qualified testing agency.

C. Sample Warranty: For special warranty.

1.10 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet to include in maintenance manuals. Include the following:

1. Methods for maintaining carpe, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to carpet and carpet cushion.

1.11 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet: Full-width rolls equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd..

1.12 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.

1.13 DELIVERY, STORAGE, AND HANDLING

A. Comply with the Carpet and Rug Institute's CRI 104.

B. Deliver carpet in original mill protective covering with mill register numbers and tags attached.

1.14 FIELD CONDITIONS

A. Comply with the Carpet and Rug Institute's CRI 104 for temperature, humidity, and ventilation limitations.

B. Environmental Limitations: Do not deliver or install carpet and carpet cushion until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.

C. Do not install carpet and carpet cushion 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.

D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.15 WARRANTY

A. Special Warranty for Carpet: Manufacturer agrees to repair or replace components of carpet installation that fail in materials or workmanship within specified warranty period.

1. Warranty does not include deterioration or failure of carpet due to unusual traffic, failure of substrate, vandalism, or abuse.
2. Failures include, but are not limited to, the following:
    a. More than 10 percent edge raveling, snags, and runs.
    b. Excess static discharge.
    c. Loss of tuft-bind strength.
    d. Loss of face fiber.
    e. Delamination.
3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET

A. Carpet as selected by Owner.

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.

C. Metal Edge/Transition Strips: Extruded aluminum with mill finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.

B. Examine carpet for type, color, pattern, and potential defects.

C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 03 30 00 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.

1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb. of water/1000 sq. ft in 24 hours.

b. Relative Humidity Test: Using in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.

D. Wood Subfloors: Verify the following:

1. Underlayment over subfloor complies with requirements specified in Section 06 16 00 "Sheathing."
2. Underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.

E. Metal Subfloors: Verify the following:

1. Underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.

F. Painted Subfloors: Perform bond test recommended in writing by adhesive manufacturer.

1. Access Flooring Systems: Verify the following:
2. Access floor substrate is compatible with carpet tile and adhesive if any.
3. Underlayment surface is flat, smooth, evenly planed, tightly jointed, and free of irregularities, gaps greater than 1/8 inch, protrusions more than 1/32 inch, and substances that may interfere with adhesive bond or show through surface.

G. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with the Carpet and Rug Institute's CRI 104 and with carpet manufacturer's written installation instructions for preparing substrates indicated to receive carpet.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.

C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.

D. Metal Substrates: Clean grease, oil, soil and rust, and prime if recommended in writing by adhesive manufacturer. Rough sand painted metal surfaces and remove loose paint. Sand aluminum surfaces, to remove metal oxides, immediately before applying adhesive.

E. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

A. General: Comply with the Carpet and Rug Institute's CRI 104 and carpet and carpet cushion manufacturers' written installation instructions for the following:

1. Direct-glue-down installation.
2. Double-glue-down installation.
3. Carpet with attached-cushion installation.
4. Pre-applied adhesive installation.
5. Hook-and-loop installation.
6. Stretch-in installation.
7. Stair installation.

B. Comply with carpet manufacturer's written instructions and Shop Drawings for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.

1. Stretch-in Carpet Installation: Install carpet cushion seams at 90-degree angle with carpet seams

C. Install pattern parallel to walls and borders unless otherwise indicated on Drawings.

D. Install borders with mitered corner seams.

E. Do not bridge building expansion joints with carpet.

F. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.

G. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

H. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet as marked on subfloor. Use nonpermanent, nonstaining marking device.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet:

1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
2. Remove yarns that protrude from carpet surface.
3. Vacuum carpet using commercial machine with face-beater element.

B. Protect installed carpet to comply with the Carpet and Rug Institute's CRI 104, Section 13.7.

C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet manufacturer and carpet cushion and adhesive manufacturers.

END OF SECTION 09 68 13

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Primers.
2. Finish coatings.
3. Floor sealers and paints.

B. Section includes surface preparation and the application of paint systems on the following exterior substrates:

1. All exposed new exterior items and surfaces, unless otherwise noted.
2. Fiber-cement siding.
3. Steel and iron.
4. Galvanized metal.
5. Aluminum (not anodized or otherwise coated).
6. Wood.
7. Concrete as noted.
8. All exposed existing items and surfaces where work has taken place and where new work abuts. Extend painting of existing surfaces to a natural break of the surface being painted.
9. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

C. Paint all exposed surfaces, except where the notes on drawings indicate that a surface or material is not to be painted or it is a warrantied pre-finished material. If the notes do not specifically mention an item or a surface, paint the item or surface the same as similar adjacent materials or surfaces whether or not notes indicate colors. If the notes do not indicate color or finish, the Architect will select from standard colors and finishes available.

D. Do not paint prefinished items, finished metal surfaces, finished galvanized metal surfaces.

1. Prefinished items include the following factory-finished components:
   a. Finished metal siding.
   b. Finished metal roofing.
   c. Finished metal flashings.
   d. Finished metal fasteners.

e. Finished mechanical and electrical equipment.

f. Finished roof accessories.

g. Finished wall accessories.

3. Finished metal surfaces include the following:

a. Anodized aluminum.

b. Stainless steel.

c. Chromium plate. (galvanized)

E. Do not paint concrete walls, conc. paving's or asphalt paving's unless otherwise noted on the drawings or elsewhere in the specifications.

F. Related Requirements:

1. 08 Section "Hollow Metal Doors and Frames" for shop priming steel doors and frames.

2. Section 09 93 00 "Staining and Transparent Finishing" for surface preparation and application of wood stains and transparent finishes on exterior wood substrates.

1.3 DEFINITIONS

A. MPI Gloss Level

1. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

2. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

3. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

4. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

5. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

6. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

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

B. General: Standard coating terms defined in ASTM D 16 apply to this Section.

1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.

2. Eggshell refers to low-sheen finish with a gloss range between 5 and 20 when measured at a 60-degree meter.

3. Satin refers to low-sheen finish with a gloss range between 15 and 35 when measured at a 60-degree meter.

4. Semigloss refers to medium-sheen finish with a gloss range between 30 and 65 when measured at a 60-degree meter.

5. Full gloss refers to high-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.
6. Specifying Authority as used in this Section means Architect, Engineer, Contracting Officer, Interior Designer, Owner or their representatives, as applicable.
7. Acceptable or Accepted means acceptable to or by the Specifying Authority.
8. Inspection Agency is an Independent Agency acceptable to Specifying Authority and will inspect the painting on this project.
9. Provide, as used in this Section, means "Furnish and install or apply complete in place."
10. Specialist means an individual or firm of established reputation (or, if newly organized, whose personnel have previously established a reputation in the same field). This individual or firm must be regularly engaged in and maintain a regular force of workmen skilled in performing required work.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include preparation requirements and application instructions.
2. Indicate VOC content.

B. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches square.
2. Apply coats on Samples in steps to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

C. Product List: Use same designations indicated on Drawings and in the Exterior Painting Schedule to cross-reference paint systems specified in this Section. Include color designations.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint Products: 5 percent, but not less than 1 gal. of each material and color applied.

1.6 QUALITY ASSURANCE

A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this Project with a record of successful in-service performance.

B. MPI Standards:

1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."

2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

C. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system.

a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.

b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.

a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the Project Site in manufacturer’s original, unopened packages and containers bearing manufacturer’s name and label, and the following information:

1. Product name or title of material.

2. Product description (generic classification or binder type.)

3. Manufacturer’s stock number and date of manufacture.

4. Contents by volume for pigment and vehicle constituents.

5. Thinning instructions.

6. Application instructions.

7. Color name and number.

8. VOC Content

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

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

1.8 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 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 the following:

1. Sherwin Williams

B. Products: Subject to compliance with requirements, available products that may be incorporated into the work include, but are not limited to, products listed in the Exterior Painting Schedule for the paint category indicated.

2.2 PAINT PRODUCTS, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

B. Material Compatibility:

1. Provide materials for use within each paint system that are 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, provide products recommended in writing by topcoat manufacturer for use in paint system and on substrate indicated.

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

2.3 PRIMERS

A. Exterior, Alkali-Resistant, Water-Based Primer: Pigmented, water-based primer formulated for use on alkaline surfaces, such as exterior plaster, vertical concrete, and masonry.

B. Exterior Wood Preservative: Solvent-based, zinc or copper naphthenate, penetrating antifungal treatment for exterior wood.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

    a. Rust-Oleum Corporation; a subsidiary of RPM International, Inc.

C. Exterior, Latex Wood Primer: White, waterborne-emulsion primer formulated for resistance to extractive bleeding, mold, and microbials; for hiding stains; and for use on exterior wood subject to extractive bleeding.

D. Exterior, Alkyd/Oil Wood Primer: Alkyd/oil-based primer that is resistant to extractive bleeding when applied to wood substrates with less than 15 percent moisture content; formulated for sag, mold, and microbial resistance; for hiding stains; and for use on exterior wood subject to extractive bleeding.

E. Water-Based Bonding Primer: Pigmented, water-based-emulsion primer formulated for exterior use and to promote adhesion of subsequent specified coatings.

F. Solvent-Based Bonding Primer: Pigmented, solvent-based primer formulated for exterior use and to seal substrates and promote adhesion of specified subsequent coatings.

G. Water-Based, Rust-Inhibitive Primer: Corrosion-resistant, water-based-emulsion primer formulated for resistance to flash rusting when applied to cleaned, exterior ferrous metals subject to mildly corrosive environments.

H. Surface-Tolerant Metal Primer: Corrosion-resistant, solvent-based metal primer formulated for use on structural steel and metal fabrications that have been minimally prepared.

I. Quick-Drying, Alkyd Metal Primer: Corrosion-resistant, solvent-based, modified-alkyd primer; lead and chromate free; formulated for quick-drying capabilities and for use on cleaned, exterior steel surfaces.

J. Alkyd Metal Primer: Corrosion-resistant, solvent-based, alkyd primer formulated for use on prepared ferrous metals subject to industrial and light marine environments.

K. Water-Based, Galvanized-Metal Primer: Corrosion-resistant, pigmented, acrylic primer; formulated for use on cleaned/etched, exterior, galvanized metal to prepare it for subsequent water-based coatings.

L. Vinyl Wash Primer: Two-component, vinyl butyral/phosphoric acid, wash primer formulated for use over cleaned metal surfaces and zinc-rich primers as a tie coat for subsequent corrosion-resistant primers or finish coatings.

M. Quick-Drying Aluminum Primer: Corrosion-resistant, solvent-based, alkyd or modified-alkyd primer formulated for quick-drying capabilities and for use on prepared exterior aluminum.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

    a. Rust-Oleum Corporation; a subsidiary of RPM International, Inc.

2.4 FINISH COATINGS

A. Exterior Latex Paint, Low Sheen: Water-based, pigmented coating; formulated for alkali, mold, microbial, and water resistance and for use on exterior surfaces, such as portland cement plaster, concrete, and primed wood.

1. Gloss and Sheen Level: Manufacturer's standard low-sheen finish.

B. Exterior Latex Paint, Semigloss: Water-based, pigmented emulsion coating formulated for alkali, mold, microbial, and water resistance and for use on exterior surfaces, such as masonry, portland cement plaster, and primed wood and metal.

1. Gloss Level: Manufacturer's standard semigloss finish.

C. Exterior Alkyd Enamel, Semigloss: Solvent-based, pigmented, alkyd enamel formulated for mold, microbial, and water resistance and for use on exterior, primed, wood and metal surfaces.

1. Gloss Level: Manufacturer's standard semigloss finish.

D. Quick-Drying Alkyd Enamel, Semigloss: Solvent-based, alkyd or modified-alkyd enamel formulated for quick-drying capabilities and for use on exterior, primed, metal and dimensionally stable wood surfaces.

1. Gloss Level: Manufacturer's standard semigloss finish.

2.5 FLOOR SEALERS AND PAINTS

A. Latex Deck Coating: Water-based, high-solids, acrylic-emulsion coating; formulated for use on exterior, concrete and wood-board traffic surfaces.

1. Gloss Level: Manufacturer's standard.
2. Minimum Solids Content: Manufacturer's standard percentage solids by volume.
3. Surface Texture: Slip resistant.

B. Solvent-Based, Concrete-Floor Sealer: Clear, acrylic, solvent-based sealer formulated for oil, gasoline, alkali, and water resistance and for use on exterior, concrete traffic surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Fiber-Cement Board: 12 percent.
3. Wood: 15 percent.
4. Gypsum Board: 12 percent.

C. Exterior Gypsum Board Substrates: Verify that finishing compound is dry and sanded smooth.

D. Verify suitability of substrates, including surface conditions and compatibility, with 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 - EXISTING SURFACES

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted or provide surface-applied protection prior to surface preparation and painting. Remove these items, if necessary, to completely paint the items and adjacent surfaces. Following completion of painting operations in each space or area, have items reinstalled by workers skilled in the trades involved.

B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease prior to cleaning. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Surface Preparation: On existing finished surfaces to be re-painted or re-finished, remove all loose, blistered, scaled, or crazed finish to bare base material surface. Where new work joins existing work, prepare existing surfaces extending to the nearest break in the plane. Wash surfaces with T.S.P. and water or other solution as required.

D. Prevent impaired bond or bleed through by removing any accumulated film of wax, oil, grease, smoke or other foreign matter.

E. After washing, rinse with potable water and let thoroughly dry.

F. On existing high or semi-gloss interior work receiving gloss finishes, wash and rinse as noted above, then wipe with liquid de-glosser or other acceptable preparation material.

G. In addition to the above cleaning, provide the following work:

1. Existing exterior wood: Use paint remover or scrape or burn off any remaining loose paint, in addition to paint removal specified above. Prime bare wood. Putty nail holes and other irregularities. Sand as required.

2. Existing plaster work by other trades: Remove, patch, and make ready for painting broken and disintegrated plaster.

   a. Fill minor cracks and defects with spackle or "Swedish putty". For large cracks and defects use approved patching plaster.

   b. Prevent high alkalinity or "hot spot" conditions by not applying new painting until moisture meter reading is 17 or under.

   c. Prime all bare, filled, and patched plaster with primer-sealer specified for new plaster.

3. Existing painted concrete - surfaces with minor loose or blistered paint: Remove any loose, flaking, and blistered paint. Clean as specified above for "PREPARE EXISTING SURFACES AS INDICATED". Fill any surface cracks with approved latex base filler, then apply primer-sealer over bare concrete and filled cracks.

4. Multi-coated surfaces with major loose or blistered paint requiring complete paint removal: Remove all paint down to bare concrete by sandblasting, pressure methods, chemicals or other means generally accepted by the trade.

   a. Fill all contraction and structural cracks with self-bonding filler or elastomeric sealant worked well into the cracks to prevent leaks. Then wipe excess material from surface.

   b. Apply latex base or approved prime and fill material to fill all "pockmarks" and air bubbles. Then wipe excess material off surface. Let filler material dry for 24 hours minimum before applying specified primer.

5. Existing painted ferrous metal: Sand rough edges of bare areas to featheredge at adjacent sound paint. Remove rust and loose paint to bare metal; solvent wash, then apply prime paint.

6. Materials Preparation: Carefully mix and prepare paint materials according to manufacturer's directions.

   a. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.

   b. Stir material before application to produce a mixture of uniform density; stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

   c. Use only thinners approved by the paint manufacturer and only within recommended limits.

3.3 PREPARATION

A. Comply with manufacturer's written instructions 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 specified in this Section.

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. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer.

F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

H. Aluminum Substrates: Remove loose surface oxidation.

I. 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 remove sanding dust.

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.

J. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.4 INSTALLATION

A. Apply paints in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

1. Use applicators and techniques suited for paint and substrate indicated.

2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.

3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.

4. Paint entire exposed surface of window frames and sashes.

5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

6. Primers specified in the Exterior Painting Schedule may be omitted on items that are factory primed or factory finished if compatible with intermediate and topcoat coatings and acceptable to intermediate and topcoat paint manufacturers.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. The number of coats and the film thickness required are the same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.

2. Omit primer on metal surfaces that have been shop primed and touchup painted.

3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform 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.

4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.

C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.

1. Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the surface or item being painted.

2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.

3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.

D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.

E. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.

F. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed

surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing. Primer to be tinted to other than finish color.

G. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

H. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.

1. Provide semi-gloss finish for final two coats.

I. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling, such as laps, irregularity in texture, skid marks, or other surface imperfections.

J. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.5 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.

2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written instructions, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written instructions.

B. The Owner may direct the Contractor to stop painting if test results show material being used does not comply with specified requirements. The Contractor shall remove noncomplying paint from the site, pay for testing, and repaint surfaces previously coated with the rejected paint. If necessary, the Contractor may be required to remove rejected paint from previously painted surfaces if, on repainting with specified paint, the 2 coatings are incompatible.

3.6 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

1. Do not clean equipment with free-draining water and prevent solvents, thinners, cleaners, and other contaminants from entering into waterways, sanitary and storm drain systems, and ground.

2. Dispose of contaminants in accordance with requirements of authorities having jurisdiction.

3. Allow empty paint cans to dry before disposal.

4. Collect waste paint by type and deliver to recycling or collection facility.

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.

3.7 EXTERIOR PAINTING SCHEDULE

A. Un-Painted Exterior Finished Concrete and Masonry (CMU and Brick)

1. Apply Masonry sealer and Graffiti Control – See Section 07 19 00 Water Repellants.

B. Previous Painted Exterior Finished Concrete and Masonry (CMU and Brick)

1. Spot Prime: Sherwin Williams PrepRite ProBlock Interior-Exterior Latex Primer-Sealer (B51-600 Series).

2. Second Coat: Sherwin Williams A-100 Exterior Latex Lowsheen (A12 series).

3. Third Coat: Sherwin Williams A-100 Exterior Latex Lowsheen (A12 series).

C. Exterior Fiber Cement Soffits

1. First Coat: Sherwin Williams Loxon Concrete and Masonry Primer-Sealer (LX02W0050).

2. Second Coat: Sherwin Williams A-100 Exterior Latex Lowsheen (A12 series).

D. Exterior Fiber Cement Siding

1. First Coat: Sherwin Williams PrepRite ProBlock Interior-Exterior Latex Primer-Sealer (B51-600 Series).

2. Second Coat: Sherwin Williams A-100 Exterior Latex Lowsheen (A12 series).

3. Third Coat: Sherwin Williams A-100 Exterior Latex Lowsheen (A12 series)

E. Existing Exterior Plywood Siding (T1-11 or similar)

1. First Coat: Sherwin Williams PrimeRX Interior-Exterior Acrylic Peel Bonding Primer (B51T00600).

2. Second Coat: Sherwin Williams A-100 Exterior Latex Lowsheen (A12 series).

3. Third Coat: Sherwin Williams A-100 Exterior Latex Lowsheen (A12 series).

F. Exterior Wood

1. Spot Prime: Sherwin Williams Fast Drying Interior-Exterior Oil-Based Primer (Y24W08980)
2. Second Coat: Sherwin Williams A-100 Exterior Latex Lowsheen (A12 series).
3. Third Coat: Sherwin Williams A-100 Exterior Latex Lowsheen (A12 series).

G. Exterior Metal Doors and Frames, Structural Steel, Previously Painted Railings, Handrails

1. First Coat: Sherwin Williams Kem Kromik Universal Metal Primer (B50WZ0001).
2. Second Coat: Sherwin Williams Pro Industrial Waterbased Alkyd Urethane Enamel Gloss (B53-2050 Series).
3. Third Coat: Sherwin Williams Pro Industrial Waterbased Alkyd Urethane Enamel Gloss (B53-2050 Series).

H. Ferrous Metal (gutters, downspouts, metal reveals and decretive shapes)

1. Spot Prime: Sherwin Williams Pro Industrial™ Pro-Cryl Universal Primer (B66-1300 Series).
2. Second Coat: Sherwin Williams Pro Industrial Waterbased Alkyd Urethane Enamel Gloss (B53-2050 Series).
3. Third Coat: Sherwin Williams Pro Industrial Waterbased Alkyd Urethane Enamel Gloss (B53-2050 Series).

END OF SECTION 09 91 13

SECTION 09 91 23 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on interior substrates including, but not limited to:

1. All exposed new interior items and surfaces, unless otherwise noted.
2. Concrete.
3. Cement board
4. Concrete masonry units (CMUs).
5. Steel and iron.
6. Galvanized metal.
7. Aluminum (not anodized or otherwise coated).
8. Copper.
9. Stainless steel.
10. Wood.
11. Plywood (including MDO)
12. Gypsum board.
13. Fiberglass.
14. Plastic
15. Acoustic panels and tiles.
16. Plaster.
17. Cotton or canvas insulation covering.
18. ASJ insulation covering.
19. All exposed existing items and surfaces where work has taken place and where new work abuts. Extend painting of existing surfaces to a natural break of the surface being painted.
20. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

B. Paint all exposed surfaces, except where the notes on drawings indicate that a room, surface or material is not to be painted or is to remain natural. If the notes do not specifically mention an item or a surface, paint the item or surface the same as similar adjacent materials or surfaces whether or not notes indicate colors. If the notes do not indicate color or finish, the Architect will select from standard colors and finishes available.

1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment.

C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels, except surface mounted raceways (Wiremold) shall be painted to match adjacent surfaces.

1. Prefinished items include the following factory-finished components:

   a. Architectural woodwork and casework.
   b. Acoustical wall panels.
   c. Metal toilet enclosures.
   d. Metal lockers.
   e. Finished mechanical and electrical equipment.
   f. Light fixtures.
   g. Distribution cabinets.

2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:

   a. Foundation spaces.
   b. Furred areas.
   c. Ceiling plenums.
   d. Utility tunnels.
   e. Pipe spaces.
   f. Duct shafts.
   g. Elevator shafts.

3. Finished metal surfaces include the following:

   a. Anodized aluminum.
   b. Stainless steel.
   c. Chromium plate.
   d. Copper.
   e. Bronze and brass.

4. Operating parts include moving parts of operating equipment and the following:

   a. Valve and damper operators.
   b. Linkages.
   c. Sensing devices.
   d. Motor and fan shafts.

5. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

D. Related Sections include the following:

1. Division 05 Section "Structural Steel Framing" for shop priming structural steel.

2. Division 05 Section "Metal Fabrications" for shop priming ferrous metal.

3. Division 08 Section "Hollow Metal Doors and Frames" for shop priming steel doors and frames.

4. Division 09 Section "Gypsum Board" for surface preparation for gypsum board.

5. Section 09 Section "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on interior wood substrates.

1.3 DEFINITIONS

A. MPI Gloss Level

1. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

2. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

3. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

4. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

5. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

6. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

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

B. General: Standard coating terms defined in ASTM D 16 apply to this Section.

1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
2. Eggshell refers to low-sheen finish with a gloss range between 5 and 20 when measured at a 60-degree meter.
3. Satin refers to low-sheen finish with a gloss range between 15 and 35 when measured at a 60-degree meter.
4. Semigloss refers to medium-sheen finish with a gloss range between 30 and 65 when measured at a 60-degree meter.
5. Full gloss refers to high-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.
6. Specifying Authority as used in this Section means Architect, Engineer, Contracting Officer, Interior Designer, Owner or their representatives, as applicable.
7. Acceptable or Accepted means acceptable to or by the Specifying Authority.
8. Inspection Agency is an Independent Agency acceptable to Specifying Authority and will inspect the painting on this project.
9. Provide, as used in this Section, means "Furnish and install or apply complete in place."
10. Specialist means an individual or firm of established reputation (or, if newly organized, whose personnel have previously established a reputation in the same field). This individual or firm must be regularly engaged in and maintain a regular force of workmen skilled in performing required work.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.

2. Indicate VOC content.

B. Samples for Initial Selection: For each type of topcoat product.

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 ½ X 11 inches.

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.

1.5 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. Paint: 5 percent, but not less than 1 gal of each material and color applied.

1.6 QUALITY ASSURANCE

A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this Project with a record of successful in-service performance.

B. Source Limitations: Obtain block fillers, primers, and undercoat materials for each coating system from the same manufacturer as the finish coats or as approved.

C. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system.

a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.

a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 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.

1.8 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.

1.9 MAINTENANCE DATA

A. Provide a schedule at completion of work showing each type and color sample, (8-1/2 x 11), of paint or coating used on the project. Include this material in O & M manual.

1.10 EXTRA MATERIALS

A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents

1. Quantity: Furnish an additional 1 gal. of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. The Sherwin-Williams Company.

2.2 PAINT, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

B. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

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

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Fiber-Cement Board: 12 percent.
3. Masonry (Clay and CMUs): 12 percent.
4. Wood: 15 percent.
5. Gypsum Board: 12 percent.
6. Plaster: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Plaster Substrates: Verify that plaster is fully cured.

E. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

F. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations 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. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.

H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

I. Wood Substrates:

1. Scrape and clean knots and apply coat of knot sealer before applying primer.
2. Sand surfaces that will be exposed to view and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

J. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

K. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 PREPARATION - EXISTING SURFACES

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted, or

provide surface-applied protection prior to surface preparation and painting. Remove these items, if necessary, to completely paint the items and adjacent surfaces. Following completion of painting operations in each space or area, have items reinstalled by workers skilled in the trades involved.

B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease prior to cleaning. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Surface Preparation: On existing finished surfaces to be re-painted or re-finished, remove all loose, blistered, scaled, or crazed finish to bare base material surface. Where new work joins existing work, prepare existing surfaces extending to the nearest break in the plane. Wash surfaces with T.S.P. and water or other solution as required.

1. Prevent impaired bond or bleed through by removing any accumulated film of wax, oil, grease, smoke or other foreign matter.

2. After washing, rinse with potable water and let thoroughly dry.

D. On existing high or semi-gloss interior work receiving gloss finishes, wash and rinse as noted above, then wipe with liquid de-glosser or other acceptable preparation material.

E. In addition to the above cleaning, provide the following work:

1. Existing interior wood: Sandpaper smooth or use liquid de-glosser to remove gloss and provide a "tooth" for finish bonding. Prime bare spots with specified primer for new work.

a. Putty, glaze or spackle cracks and other irregularities; color filler material to match stain on transparent finishes.

2. Existing plaster work by other trades: Remove, patch, and make ready for painting broken and disintegrated plaster.

a. Fill minor cracks and defects with spackle or "Swedish putty". For large cracks and defects use approved patching plaster.

b. Prevent high alkalinity or "hot spot" conditions by not applying new painting until moisture meter reading is 17 or under.

c. Prime all bare, filled, and patched plaster with primer-sealer specified for new plaster.

3. Existing gypsum wallboard: Board with major damage, breaks or holes is required to be repaired, finished and textured by other trades.

a. Fill minor isolated defects and damaged areas in previously painted surfaces with vinyl base spackle. Apply texture on minor work repaired under this Section as required to match existing adjacent surfaces.

b. Using specified primer-sealer, prime all bare and newly textured surfaces scheduled to receive paint.

4. Existing painted concrete - surfaces with minor loose or blistered paint: Remove any loose, flaking, and blistered paint. Clean as specified above for "PREPARE EXISTING SURFACES AS INDICATED". Fill any surface cracks with approved latex base filler, then apply primer-sealer over bare concrete and filled cracks.

5. Multi-coated surfaces with major loose or blistered paint requiring complete paint removal: Remove all paint down to bare concrete by sandblasting, pressure methods, chemicals or other means generally accepted by the trade.
   a. Fill all contraction and structural cracks with self-bonding filler or elastomeric sealant worked well into the cracks to prevent leaks. Then wipe excess material from surface.
   b. Apply latex base or approved prime and fill material to fill all "pockmarks" and air bubbles. Then wipe excess material off surface. Let filler material dry for 24 hours minimum before applying specified primer.
6. Existing painted ferrous metal: Sand rough edges of bare areas to featheredge at adjacent sound paint. Remove rust and loose paint to bare metal; solvent wash, then apply prime paint.
7. Materials Preparation: Carefully mix and prepare paint materials according to manufacturer's directions.
   a. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
   b. Stir material before application to produce a mixture of uniform density; stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.
   c. Use only thinners approved by the paint manufacturer and only within recommended limits.

3.4 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
   1. Use applicators and techniques suited for paint and substrate indicated.
   2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
   3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
   4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
   5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed in occupied spaces:

a. Equipment, including panelboards.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit and fittings.
f. Plastic conduit and fittings.
g. Ductwork and fittings.
h. Insulation.
i. Motors and mechanical equipment.
j. Tanks that do not have factory-applied final finishes.
k. Accessory items.
l. Other items as directed by Architect.

2. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

A. Ferrous Metal (unprimed) (light and ordinary exposures), (Not galvanized)

Primer: Pro Industrial™ Pro-Cryl® Universal Primer, B66-310 Series

1st coat: Pro Industrial™ Acrylic Semi-Gloss, B66-650 Series

2nd coat: Pro Industrial™ Acrylic Semi-Gloss, B66-650 Series

B. Galvanized (Zinc-Coated) Metal

Primer: Pro Industrial™ Pro-Cryl® Universal Primer, B66-310 Series

1st coat: Pro Industrial™ Acrylic Semi-Gloss, B66-650 Series

2nd coat: Pro Industrial™ Acrylic Semi-Gloss, B66-650 Series

C. Wood-painted (window frames and sash, cabinets, partitions, painted trim, etc.)

Primer: PrepRite® ProBlock® Latex Primer/Sealer B51 Series

1st coat: Pro Industrial™ Acrylic Semi-Gloss, B66-650 Series

2nd coat: Pro Industrial™ Acrylic Semi-Gloss, B66-650 Series

D. Wood -stained (standing and running trim, doors, door frames, exposed joists, paneling, plywood, window frames and sash, cabinets, partitions, glued-laminated members, etc.)

Stain: Wood Classics® 250 Stain, A49-800 Series

2nd coat: Wood Classics® Waterborne Polyurethane Satin or Gloss A68 Series

3rd coat: Wood Classics® Waterborne Polyurethane Satin or Gloss A68 Series

E. Gypsum Wallboard, Walls and Ceilings

Primer: ProMar® 200 Zero VOC Latex Primer, B28W2600

1st coat: ProMar® 200 Zero VOC Interior Latex Semi-Gloss, B31-2600 Series

2nd coat: ProMar® 200 Zero VOC Interior Latex Semi-Gloss, B31-2600 Series

END OF SECTION 09 91 23

SECTION 09 93 00 - STAINING AND TRANSPARENT FINISHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes surface preparation and application of wood stains and transparent finishes on the following substrates:

1. Exterior Substrates:

    a. Exposed glued-laminated beams and columns.
    b. Exposed framing.

2. Interior Substrates:

    a. Exposed glued-laminated beams and columns.
    b. Exposed framing.
    c. Dressed lumber (finish carpentry or woodwork).
    d. Wood-based panel products.

B. Related Requirements:

1. Section 09 91 23 "Interior Painting" for stains and transparent finishes on concrete floors.

1.3 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.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
2. Indicate VOC content.

B. Samples for Initial Selection: For each type of 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.
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 finish system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, 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. Stains and Transparent Finishes: 5 percent, but not less than 1 gal of each material and color applied.

1.6 QUALITY ASSURANCE

A. Mockups: Apply mockups of each finish system indicated and each color selected to verify preliminary selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each type of finish system and substrate.

a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft..
b. Other Items: Architect will designate items or areas required.

2. Final approval of stain color selections will be based on mockups.

a. If preliminary stain color selections are not approved, apply additional mockups of additional stain colors selected by Architect at no added cost to Owner.

1.7 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.

1.8 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. Interior: MinWax Gel Stain 3 Coats: - Minwax® Water-Based Helmsman® Urethane Semi Gloss Clear.

B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include but are not limited to products listed in wood finish systems schedules for the product category indicated.

2.2 MATERIALS, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products List."

B. Material Compatibility:

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

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

2.3 SOURCE QUALITY CONTROL

A. Testing of Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample wood finishing materials. Contractor will be notified in advance and may be present when samples are taken. If materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying wood finishes if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying materials from Project site, pay for testing, and refinish surfaces finished with rejected materials. Contractor will be required to remove rejected materials from previously finished surfaces before refinishing with complying materials if the two finishes are incompatible or produce results that, in the opinion of the Architect, are aesthetically unacceptable.

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 Exterior Wood Substrates: 15 percent, when measured with an electronic moisture meter.

C. Maximum Moisture Content of Interior Wood Substrates: 13 percent, when measured with an electronic moisture meter.

D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

E. 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. Exterior Wood Substrates:

1. Scrape and clean knots and apply coat of knot sealer before applying primer.
2. Prime edges, ends, faces, undersides, and backsides of wood.

a. For stained wood, stain edges and ends after priming.

3. Countersink steel nails, if used, and fill with putty or plastic wood filler tinted to final color. Sand smooth when dried.

E. Interior Wood Substrates:

1. Scrape and clean knots and apply coat of knot sealer before applying primer.
2. Apply wood filler paste to open-grain woods, as defined in "MPI Architectural Painting Specification Manual," to produce smooth, glasslike finish.
3. Sand surfaces exposed to view and dust off.
4. 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.

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 EXTERIOR WOOD-FINISH-SYSTEM SCHEDULE

A. Wood Substrates: Glued-laminated construction.
   1. Semitransparent Stain System, MPI EXT 6.3D:
      a. Prime Coat: Stain, exterior, solvent based, semitransparent, matching topcoat.
      b. Topcoat: Stain, exterior, solvent based, semitransparent, MPI #13.
         1) Penofin Ultra Premium Red Label.

B. Wood Substrates: Exposed framing.
   1. Semitransparent Stain System, MPI EXT 6.3D:
      a. Prime Coat: Stain, exterior, solvent based, semitransparent, matching topcoat.
      b. Topcoat: Stain, exterior, solvent based, semitransparent, MPI #13.
         1) Penofin Ultra Premium Red Label.

C. Wood Substrates: Wood trim, architectural woodwork, doors.
   1. Semitransparent Stain System, MPI EXT 6.3D:
      a. Prime Coat: Stain, exterior, solvent based, semitransparent, matching topcoat.
      b. Topcoat: Stain, exterior, solvent based, semitransparent, MPI #13.
         1) Penofin Ultra Premium Red Label.

3.6 INTERIOR WOOD -FINISH-SYSTEM SCHEDULE

A. Wood Substrates: Glued-laminated construction.
   1. Water-Based Varnish over Stain System MPI INT 6.1R:
      a. Stain Coat: Stain, semitransparent, for interior wood, MPI #90.
      b. First Intermediate Coat: Water-based varnish matching topcoat.
      c. Second Intermediate Coat: Water-based varnish matching topcoat.
      d. Topcoat: Varnish, water based, clear, satin (MPI Gloss Level 4), MPI #128.

e. Topcoat: Varnish, water based, clear, semi-gloss (MPI Gloss Level 5), MPI #129.

f. Topcoat: Varnish, water based, clear, gloss (MPI Gloss Level 6), MPI #130.

B. Wood Substrates: Exposed framing.

1. Water-Based Varnish over Stain System MPI INT 6.2M:

a. Stain Coat: Stain, semitransparent, for interior wood, MPI #90.

b. First Intermediate Coat: Water-based varnish matching topcoat.
c. Second Intermediate Coat: Water-based varnish matching topcoat.
d. Topcoat: Varnish, water based, clear, satin (MPI Gloss Level 4), MPI #128.

C. Wood Substrates: Wood trim, architectural woodwork, doors and wood board paneling.

1. Water-Based Varnish over Stain System MPI INT 6.3W:

a. Stain Coat: Stain, semitransparent, for interior wood, MPI #90.

b. First Intermediate Coat: Water-based varnish matching topcoat.
c. Second Intermediate Coat: Water-based varnish matching topcoat.
d. Topcoat: Varnish, water based, clear, satin (MPI Gloss Level 4), MPI #128.

e. Topcoat: Varnish, water based, clear, semi-gloss (MPI Gloss Level 5), MPI #129.

f. Topcoat: Varnish, water based, clear, gloss (MPI Gloss Level 6), MPI #130.

D. Wood Substrates: Wood paneling.

1. Water-Based Varnish over Stain System MPI INT 6.4U:

a. Stain Coat: Stain, semitransparent, for interior wood, MPI #90.

b. First Intermediate Coat: Water-based varnish matching topcoat.
c. Second Intermediate Coat: Water-based varnish matching topcoat.
d. Topcoat: Varnish, water based, clear, satin (MPI Gloss Level 4), MPI #128.

e. Topcoat: Varnish, water based, clear, semi-gloss (MPI Gloss Level 5), MPI #129.

f. Topcoat: Varnish, water based, clear, gloss (MPI Gloss Level 6), MPI #130.

END OF SECTION 09 93 00

SECTION 10 14 23.16 - ROOM-IDENTIFICATION PANEL SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes room-identification signs that are directly attached to the building.

1.3 DEFINITIONS

A. Accessible: In accordance with the accessibility standard.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For room-identification signs.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.

C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.

1. Include representative Samples of available typestyles and graphic symbols.

D. Samples for Verification: For each type of sign assembly showing all components and with the required finishes, in manufacturer's standard size unless otherwise indicated and as follows:

1. Room-Identification Signs: Full-size Sample.
2. Full-size Samples, if approved, will be returned to Contractor for use in Project.

E. Product Schedule: For room-identification signs. Use same designations indicated on Drawings or specified.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer.

B. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

1.7 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. Variable Component Materials: 12 replaceable text inserts and interchangeable characters (letters, numbers, and graphic elements) of each type.
2. Tools: One set of specialty tools for assembling signs and replacing variable sign components.

1.8 WARRANTY

A. Special Warranty: 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 finishes beyond normal weathering.
b. Deterioration of embedded graphic image.
c. Separation or delamination of sheet materials and components.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Accessibility Standard: Comply with applicable provisions in the USDOJ's “2010 ADA Standards for Accessible Design”.

2.2 ROOM-IDENTIFICATION SIGNS

A. Room-Identification Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
1. Laminated-Sheet Sign: Photopolymer face sheet with raised graphics laminated to acrylic backing sheet to produce composite sheet.

a. Composite-Sheet Thickness: Manufacturer's standard for size of sign.

b. Surface-Applied Graphics: Applied vinyl film.
c. Colors: As selected by Architect from manufacturer's full range.

2. Sign-Panel Perimeter: Finish edges smooth.

a. Edge Condition Beveled.
b. Corner Condition in Elevation: Rounded to radius indicated.

3. Mounting: Manufacturer's standard method for substrates indicated with concealed anchors.
4. Text and Typeface: Accessible raised characters and Braille typeface as selected by Architect from manufacturer's full range. Finish raised characters to contrast with background color, and finish Braille to match background color.

2.3 SIGN MATERIALS

A. Acrylic Sheet: ASTM D4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).

B. Vinyl Film: UV-resistant vinyl film with pressure-sensitive, permanent adhesive; die cut to form characters or images as indicated on Drawings.

C. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

2.4 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following:

1. Use concealed fasteners and anchors unless indicated to be exposed.
a. Fastener Heads: Use flathead screws and bolts with tamper-resistant Allen-head slots unless otherwise indicated.

2. Sign Mounting Fasteners:

a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material or screwed into back of sign assembly unless otherwise indicated.

2.5 FABRICATION

A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.

1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling

limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.

2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
3. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
4. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.

B. Subsurface-Applied Graphics: Apply graphics to back face of clear face-sheet material to produce precisely formed image. Image shall be free of rough edges.

C. Signs with Changeable Message Capability: Fabricate signs to allow insertion of changeable messages as follows:

1. For slide-in changeable inserts, fabricate slot without burrs or constrictions that inhibit function. Furnish initial changeable insert. Furnish two blank inserts for each sign for Owner's use.
2. For frame to hold changeable sign panel, fabricate frame without burrs or constrictions that inhibit function. Furnish initial sign panel.

2.6 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.

1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Install signs so they do not protrude or obstruct according to the accessibility standard.
3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.

B. Accessibility: Install signs in locations on walls as indicated on Drawings and according to the accessibility standard.

C. Mounting Methods:

1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.

3.2 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. Remove temporary protective coverings and strippable films as signs are installed.

C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 10 14 23.16

SECTION 10 26 00 - WALL PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Corner guards.

B. Related Requirements:

1. Section 08 71 00 "Door Hardware" for metal and plastic protective trim units, according to BHMA A156.6, used for armor, kick, mop, and push plates.

1.3 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.

C. Samples for Initial Selection: For each type of impact-resistant wall-protection unit indicated, in each color and texture specified.

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.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of wall and door protection product to include in maintenance manuals.

1. Include precautions against using cleaning materials and methods that may be detrimental to finishes and performance.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Mounting and Accessory Components: Amounts proportional to the quantities of extra materials. Package mounting and accessory components with each extra material.

1.6 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.

a. Store corner-guard covers in a vertical position.

1.7 WARRANTY

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain wall protection products from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities.

2.3 CORNER GUARDS

1. Surface-Mounted, Resilient Plastic Corner Guards:

a. Cover: Rigid, impact-resistant plastic, nominal 0.078 inch (1.9 mm) thick, in dimensions and profiles indicated.

2. G200 Series; wing size: nominal 3 x 3 inches.
3. Korogard Wall Protection Systems; a division of RJF International Corporation.
4. Corner Radius: 1/4 inch.
5. Color: selected from manufacturers entire standard color range.
6. Mounting: Contact cement, construction adhesive or double-faced self-adhesive foam tape.

2.4 FABRICATION

A. Fabricate wall protection according to requirements indicated for design, performance, dimensions, and member sizes, including thicknesses of components.

B. 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.

2.5 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 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 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. Mounting Heights: Install wall and door protection in locations and at mounting heights indicated on Drawings.

C. 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.

3.4 CLEANING

A. Immediately after completion of installation, clean plastic covers and accessories using a standard ammonia-based household cleaning agent.

B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION 10 26 00

SECTION 10 28 00 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Public-use washroom accessories.
2. Under lavatory guards.

1.3 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Include electrical characteristics.

B. Samples: Full size, for each exposed product and for each finish specified.

1. Approved full-size Samples will be returned and may be used in the Work.

C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.
2. Identify accessories using designations indicated.

1.5 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For accessories to include in maintenance manuals.

1.7 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 OWNER-FURNISHED MATERIALS

A. Owner-Furnished Materials:

1. Toilet Tissue Dispenser.
2. Paper Towel Dispenser (Where surfaced mounted).
3. Liquid Soap Dispenser.

2.2 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.

2.3 PUBLIC-USE WASHROOM ACCESSORIES

A. Source Limitations: Obtain public-use washroom accessories from single source from single manufacturer.

B. Toilet Tissue (Roll) Dispenser:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Bobrick Washroom Equipment, Inc.
b. Bradley Corporation.

2. Description: Double-roll dispenser with shelf.
3. Mounting: Surface mounted.
4. Operation: Non-control 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).
7.

C. Paper Towel (Folded) Dispenser:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. Bobrick Washroom Equipment, Inc.
   b. Bradley Corporation.

2. Mounting: Surface mounted.
3. Minimum Capacity: 400 single-fold towels.
4. Material and Finish: Stainless steel, No. 4 finish (satin).
5. Lockset: Tumbler type.
6. Refill Indicator: Pierced slots at sides or front.

D. Paper Towel (Roll) Dispenser:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. Bobrick Washroom Equipment, Inc.
   b. Bradley Corporation.

2. Description: Lever-actuated mechanism permitting controlled delivery of paper rolls in preset lengths per stroke.
3. Mounting: Surface mounted.
4. Minimum Capacity: 8-inch-wide, 800-foot-long roll.
5. Material and Finish: Stainless steel, No. 4 finish (satin).
6. Lockset: Tumbler type.

E. Paper Towel (Folded) Dispenser / Waste Receptacle Unit (Recessed):

1. Must fit into existing CMU wall recess. Any modifications to fit smaller unit to be approved by Architect.

2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. Bobrick Washroom Equipment, Inc.
   b. Bradley Corporation.

3. Mounting: Surface mounted with recess into wall.
4. Minimum Capacity: Min. 600 single-fold towels.
5. Waste Capacity: match existing min.
6. Material and Finish: Stainless steel, No. 4 finish (satin).
7. Lockset: Tumbler type.

F. Waste Receptacle (Recessed):

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Bobrick Washroom Equipment, Inc.
    b. Bradley Corporation.

2. Mounting: Surface mounted with recess into wall.
3. Waste Capacity: match existing min.
4. Material and Finish: Stainless steel, No. 4 finish (satin).

G. Liquid-Soap Dispenser:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Bobrick Washroom Equipment, Inc.
    b. Bradley Corporation.

2. Description: Designed for dispensing soap in liquid form.
3. Mounting: Vertically oriented, surface mounted.
4. Lockset: Tumbler type.
5. Refill Indicator: Window type.

H. Grab Bar:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Bobrick Washroom Equipment, Inc.
    b. Bradley Corporation.

2. Mounting: Flanges with exposed fasteners.
3. Material: Stainless steel, 0.05 inch thick.

    a. Finish: Smooth, No. 4 finish (satin) on ends and slip-resistant texture in grip area.

4. Outside Diameter: 1-1/2 inches.
5. Configuration and Length: As indicated on Drawings.

I. Seat-Cover Dispenser:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. Bobrick Washroom Equipment, Inc.
   b. Bradley Corporation.

2. Mounting: Surface mounted.
3. Minimum Capacity: 500 seat covers.
4. Exposed Material and Finish: Stainless steel, No. 4 finish (satin).
5. Lockset: Tumbler type.

J. Mirror Unit:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. Bobrick Washroom Equipment, Inc.
   b. Bradley Corporation.

2. Frame: Stainless-steel channel.

   a. Corners: Manufacturer's standard.

3. Integral Shelf: 5 inches deep.
4. 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.

5. Size: As indicated on Drawings.

K. Coat Hook:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. Bobrick Washroom Equipment, Inc.
   b. Bradley Corporation.

2. Description: Single-prong unit.
3. Material and Finish: Stainless steel, No. 4 finish (satin).

2.4 UNDERLAVATORY GUARDS

A. Under lavatory Guard:

1. Description: Insulating pipe covering for supply and drain piping assemblies that prevents direct contact with and burns from piping; allow service access without removing coverings.
2. Material and Finish: Antimicrobial, molded plastic, white.

2.5 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.

B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.

C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch minimum nominal thickness.

D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.

E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.6 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F 446.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION 10 28 00

SECTION 10 56 00 - SHELVING AND CLOSET HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Shelf standards, brackets, and accessories.
   2. Closet hardware and accessories.
   3. Miscellaneous wall brackets and accessories.

B. Related Requirements:
   1. Section 06 10 00 " Rough Carpentry" for wood blocking for mounting.
   2. Section 06 20 23 "Interior Finish Carpentry" for trim.
   3. Section 12 32 00 " Manufactured Casework"

1.3 REFERENCES

A. ANSI/BHMA A156.9, American National Standard for Cabinet Hardware.

1.4 DESIGN / PERFORMANCE REQUIREMENTS

A. Shelf standards and brackets meet or exceed the ANSI performance standards as established by ANSI/BHMA A156.9.

1.5 ACTION SUBMITTALS

A. Submit under provisions of Section 01 30 00.

B. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, features and finishes.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Samples: For each exposed product and for each color and texture specified.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For shades to include in maintenance manuals.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver items in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not install 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 items are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Allow clearances for operating hardware through entire operating range. Notify Architect of installation conditions that vary from Drawings.

1.10 WARRANTY

A. Provide manufacturer's limited lifetime warranty.

B. See Section 01 60 00 - Product Requirements.

C. Deliver extra sets of hardware items for Owner's use in maintenance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain shelf standards, brackets, and accessories from single source from single manufacturer.

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

2.2 SHELF STANDARDS, BRACKETS, AND ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Knape & Vogt Mfg. Co.

B. Shelf Standard Components: Super-Duty 87 Standard single-slotted channel wall standards. Standards mounted to a suitable wall surface with mounting hardware 16 inches (406 mm) o.c. is capable of supporting 540 to 1,060 pounds per pair of standards when properly installed.

1. Face Width: 7/8 inch (22 mm), single slotted

2. Material:

a. Material and Finish: Steel, Anochrome, electro zinc-plated, clear lacquer, ROHS compliant.

3. Lengths: As required to support shelving indicated

C. Straight Shelf Bracket Components: Steel, reinforced, locking into slots with molded nylon cam lock lever; size to suit shelves. Brackets adjustable in 2 inch increments along entire length of standard, drilled and countersunk for screws.

1. Shelf Brackets
    a. Triple rung system Model 187
    b. 12 gage steel, reinforced, locking into slots with molded nylon cam lock lever; size to suit shelves; same finish as standards
2. Shelving:
    a. Per Casework Manufacturer
3. Accessories
    a. 213 Shelf rests.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, locations of connections to building electrical system, and other conditions affecting performance of the Work. Do not begin installation until substrates have been properly prepared.

B. Proceed with installation only after unsatisfactory conditions have been corrected. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare components to receive hardware using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Mount standards to solid backing capable of supporting intended loads. Install standards using fasteners suitable for supporting intended loads.

C. Install brackets as indicated on the Drawings.

D. Install shelving, and accessories as indicated on the Drawings.

3.4 CLEANING AND PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 10 56 00

SECTION 10 75 16 - GROUND-SET FLAGPOLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes ground-set flagpoles made from stainless steel.

B. Owner-Furnished Material: Flags.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Include construction details, material descriptions, dimensions of individual components and profiles, operating characteristics, fittings, accessories, and finishes for flagpole.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For flagpole to include in operation and maintenance manuals.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Spiral wrap flagpole with heavy paper and enclose in a hard fiber tube or other protective container.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain flagpole as complete unit, including fittings, accessories, base, and anchorage devices, from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Flagpole assemblies shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

B. Structural Performance: Flagpole assemblies, including anchorages and supports, shall withstand design loads indicated within limits and under conditions indicated.

1. Wind Loads: Determine according to NAAMM FP 1001. Basic wind speed for Project location is 105mph.
2. Base flagpole design on nylon or cotton flags of maximum standard size suitable for use with flagpole or flag size indicated, whichever is more stringent.

2.3 STAINLESS-STEEL FLAGPOLES

A. Stainless-Steel Flagpole: Cone-tapered flagpoles fabricated from pipe, tube, or plate complying with ASTM A312/A312M, ASTM A269, or ASTM A666, Type 316L.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Acme Lingo Flagpoles.
b. Baartol Company.
c. Ewing Flagpole Co., Inc.; Ewing Group Company.
d. Pole-Tech Co., Inc.

B. Exposed Height: 25 feet.

C. Construct flagpoles in one piece if possible. If more than one piece is necessary, comply with the following:

1. Fabricate shop and field joints without using fasteners, screw collars, or lead calking.
2. Provide flush hairline joints using self-aligning, snug-fitting, internal sleeves.

D. Metal Foundation Tube: Manufacturer's standard corrugated-steel foundation tube, 0.060-inch wall thickness with 3/16-inch steel bottom plate and support plate; 3/4-inch-diameter, steel ground spike; and steel centering wedges welded together. Galvanize foundation tube after assembly. Furnish loose hardwood wedges at top of foundation tube for plumbing pole.

1. Flashing Collar: Same material and finish as flagpole.

E. Cast-Metal Shoe Base: Made from steel with finish matching flagpole for anchor-bolt mounting; furnish with anchor bolts.

1. Furnish ground spike.

2.4 FITTINGS

A. Finial Ball: Flush-seam ball, to match flagpole-butt diameter.
   1. Spun stainless steel, finished to match flagpole.

B. Internal Halyard, Winch System: Manually operated winch with control stop device and removable handle, stainless-steel cable halyard, and concealed revolving truck assembly with plastic-coated counterweight and sling. Furnish flush access door secured with cylinder lock. Finish truck assembly to match flagpole.

   1. Halyard Flag Snaps: Stainless-steel swivel snap hooks with neoprene or vinyl covers. Furnish two per halyard.

2.5 MISCELLANEOUS MATERIALS

A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M.

B. Drainage Material: Crushed stone or crushed or uncrushed gravel; coarse aggregate.

C. Sand: ASTM C33/C33M, fine aggregate.

D. Elastomeric Joint Sealant: Multicomponent nonsag urethane joint sealant complying with requirements in Section 07 92 00 "Joint Sealants."

E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

2.6 STAINLESS-STEEL FINISHES

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

   1. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
   2. Directional Satin Finish: No. 4.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare uncoated metal flagpoles that are set in foundation tubes by painting below-grade portions with a heavy coat of bituminous paint.

B. Foundation Excavation: Excavate to neat clean lines in undisturbed soil. Remove loose soil and foreign matter from excavation and moisten earth before placing concrete. Place and compact drainage material at excavation bottom.

C. Provide forms where required due to unstable soil conditions and for perimeter of flagpole base at grade. Secure and brace forms to prevent displacement during concreting.

D. Foundation Tube: Place foundation tube, center, and brace to prevent displacement during concreting. Place concrete. Plumb and level foundation tube and allow concrete to cure.

E. Sleeves: Locate and secure sleeves in forms by bracing to reinforcement and forms.

F. Anchor Bolts: Locate and secure anchor bolts in forms with templates and by tying to reinforcement.

G. Place concrete, as specified in Section 03 30 00 "Cast-in-Place Concrete." Compact concrete in place by using vibrators. Moist-cure exposed concrete for no fewer than seven days or use nonstaining curing compound.

H. Trowel exposed concrete surfaces to a smooth, dense finish, free of trowel marks, and uniform in texture and appearance. Provide positive slope for water runoff to perimeter of concrete base.

3.2 FLAGPOLE INSTALLATION

A. General: Install flagpoles where indicated and according to manufacturer's written instructions.

B. Foundation Tube: Place flagpole in tube, seated on bottom plate between steel centering wedges, and install hardwood wedges to secure flagpole in place. Place and compact sand in foundation tube and remove hardwood wedges. Seal top of foundation tube with a 2-inch layer of elastomeric joint sealant and cover with flashing collar.

END OF SECTION 10 75 16

SECTION 10 81 13 - BIRD BARRIER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes: Bird Barrier Birdwire installed on exposed ledges where birds loaf but do not nest, to prevent loafing and damage from droppings.

1.3 ACTION SUBMITTALS

A. Product Data: Submit manufacturer’s samples, catalog cuts, shop sketches and other descriptive material.

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

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: To include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual length per field measurements before fabrication.

PART 2 - PRODUCTS

2.1: ACCEPTABLE MANUFACTURER: includes but is not limited to,

A. Bird Barrier America, Inc., 20925 Chico Street, Carson, CA 90746. Phone 800-503-5444, Fax 424-527-8005

2.2: MATERIAL:

A. Birdwire posts, springs, brackets, clamps.

Material: 316 Stainless Steel

Height: Rods 3.5”.

Birdwire:

Seven- stranded, stainless steel wire, coated with clear nylon. Diameter is 0.7 mm with a breaking strength of 100 lbs.

Length as required per drawings.

2.3: MOUNTING SYSTEMS

A. Steel, sheet metal, or concrete, stone or brick with no holes in substrate: Use Birdwire stick-on bases and Bird Barrier Super Bond. Please experiment with the stick-on system before doing an entire job. The Bond is so powerful it has been known to pull up weaker substrates. Please follow Bond literature carefully.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2: SURFACE PREPARATION

A. Ledges and mounting surfaces must be clean, dry and free of peeling paint, rust, bird droppings or other debris.

3.3: INSTALLATION

A. Install Birdwire as recommended in the installation instructions, which are supplied by the manufacturer. The first row of Birdwire shall nearly overhang the outer edge of the ledge. This can be accomplished by bending the outer post once it is inserted in the anchor rivet.

B. Birdwire shall cover the complete ledge, not just the outer perimeter. Birdwire shall extend to each corner. Birdwire is an anti-landing device, not a barrier. No more than 2.5″ can be left between rows or wire, and no more than 5 feet can be left between posts lengthwise along the ledge.

C. Birdwire shall be installed in lengths of no more than 10′ per section of wire. Every 10′ there shall be a spring and termination of the wire section. The next 10′ section simply continues from the same post.

3.4 INSPECTION

A. Visually inspect the Birdwire for loose wires or other problems related to poor installation or surface preparation.

B. Repair as necessary immediately.

END OF SECTION 10 81 13

SECTION 12 24 13 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Manually operated roller shades with single rollers.
2. Motor-operated roller shades with single rollers.

B. Related Requirements:

1. Section 061000 "Rough Carpentry for wood blocking and grounds for mounting roller shades and 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, 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.

1. Motor-Operated Shades: Include details of installation and diagrams for power, signal, and control wiring.

C. Samples: For each exposed product and for each color and texture specified, 10 inches long.

D. Samples for Initial Selection: For each type and color of shadeband material.

1. Include Samples of accessories involving color selection.

E. Samples for Verification: For each type of roller shade.

1. Shadeband Material: Not less than 6 inches square. Mark interior face of material if applicable.
2. Installation Accessories: Full-size unit, not less than 10 inches long.

F. Product Schedule: For roller shades.

1.4 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.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For roller shades to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Roller Shades: Full-size units equal to 5 percent of quantity installed for each size, color, and shadeband material indicated, but no fewer than two units.

1.7 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.

1.8 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.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.2 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. MechoShade Systems, Inc., provided and installed by Blind Depot, Inc.

(360) – 754 - 0123

B. 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: Manufacturer's standard.

a. Loop Length: Full length of roller shade.
b. Limit Stops: Provide upper and lower ball stops.
c. Chain-Retainer Type: Clip, jamb mount.

C. 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.

D. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.

E. Shadebands:

1. Shadeband Material: Light-filtering fabric.
2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.

a. Type: Enclosed in sealed pocket of shadeband material.

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 4 inches.

2. Exposed Headbox: Rectangular, extruded-aluminum enclosure including front fascia, top and back covers, endcaps, and removable bottom closure.

a. Height: Manufacturer's standard height required to enclose roller and shadeband assembly when shade is fully open, but not less than 4 inches.

3. Endcap Covers: To cover exposed endcaps.
4. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.3 SHADEBAND MATERIALS

A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

B. Light-Filtering Fabric: Woven fabric, stain and fade resistant.

1. Source: Roller shade manufacturer.
2. Type: Woven PVC-coated fiberglass.
3. EuroTwill 6000, finely woven Reversible Weave at 3 percent open.
4. Weave: Basketweave.
5. Roll Width: as shown on drawings for locations and approximate width, field measurements required.
6. Orientation on Shadeband: Up the bolt.
7. Openness Factor: 3 percent.
8. 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.

2. Railroaded Materials: Railroad material where material roll width is less than the required width of shadeband and where indicated. Provide battens and seams as required by railroaded material to produce shadebands with full roll-width panel(s) plus, if required, one partial roll-width panel located at top of shadeband.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, locations of connections to building electrical system, 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. Electrical Connections: Connect motor-operated roller shades to building electrical system.

C. Roller Shade Locations: As indicated on Drawings.

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.

C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain motor-operated roller shades.

END OF SECTION 12 24 13

SECTION 12 32 00 - MANUFACTURED CASEWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. The Section includes all labor, equipment, hardware and materials to furnish and install plastic laminate casework, countertops, benches and window stools. This includes but is not limited to all cabinets, tops and related items to provide a complete installation. Cut-outs for cabinet-installed sinks, fixtures and appliances are also part of this Section.

B. Section Includes:

1. Furnish and install, custom and standard, complete in place except as hereinafter set forth, factory-fabricated, assembled and finished plastic-laminate faced (and wood veneer faced where indicated) fixed casework (cabinets), mobile casework, bookshelves, utility shelving, and other special items described herein, all as shown on the Drawings.
    a. See drawings for type and style required.
    b. Completely coordinate with work of all other trades.
2. This Section shall also include all windowsills, panels and other similar applications, and references countertops (and back splashes), unless specifically noted for inclusion under another Section. Countertops shall be assumed to be provided at all base cabinets under 60 inches above finished floor, whether shown or called out or not.
    a. See drawings for type and style required.
    b. Completely coordinate with work of all other trades.
3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.
4. Casework items shall meet or exceed the standard of construction and material quality set forth in the references AWI standards.
5. Manufacturers shall alter their casework as necessary to suit building dimensions, and to suit equipment to be installed adjacent thereto.
6. Wood furring, blocking, shims, and hanging strips for installing casework that are not concealed within other construction.

C. Related Requirements:

1. Section 06 10 00 "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets that are concealed within other construction before cabinet installation.
2. Section 07 92 00 “Joint Sealers” for miscellaneous Joint sealers.
3. Section 09 29 00 “Gypsum Board” for Cementitious backer unit substrate.
4. Division 09 for sections on wall and floor coverings.
5. Section 09 65 19 “Resilient Tile Flooring and Accessories” for resilient base applied to casework.
6. Section 12 36 24 "Plastic Laminate Countertops."
7. Divisions 21, 22 & 23 for possible fire suppression, sinks, faucets and other plumbing fixtures and piping, ductwork and other misc. items within these sections.
8. Divisions 26, 27 & 28. for possible electrical items, communication items, electrical safety and security items and other misc. items within these sections.

1.3 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.

B. Hardware Coordination: Distribute copies of approved hardware schedule specified in Section 08 71 00 "Door Hardware” to manufacturer of architectural cabinets; coordinate Shop Drawings and fabrication with hardware requirements.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct preinstallation meeting as part of general construction meeting or separately as necessary.

1.5 ACTION SUBMITTALS

A. Shop Drawings:

1. Submit complete shop drawings with elevations minimum 1/4" = 12" or larger. Floor plans to be 1/4" = 12" or larger, sections and details to be 1-1/2" = 12" or larger.
2. Show sizes, dimensions and connections to other items for coordination with other trades.
3. Show complete details of construction.
4. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
5. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, and other items installed in casework.
6. Show location(s) of each item, dimensioned plans and elevations, large scale details, attachment devices and other components. Locate sink centerlines for guidance of other trades.

B. Samples: For each exposed product and for each color and texture specified, in manufacturer's or manufacturer's standard size.

C. Samples for Initial Selection: For each type of exposed finish.

D. Samples for Verification: For the following:

1. Plastic Laminates: 8 by 10 inches, for each type, color, pattern, and surface finish required.

   a. Provide one sample applied to core material with specified edge material applied to one edge.

2. Thermoset Decorative Panels: 8 by 10 inches, for each color, pattern, and surface finish.

   a. Provide edge banding on one edge.

3. Corner Pieces:

   a. Cabinet-front frame joints between stiles and rails and at exposed end pieces, 18 inches high by 18 inches wide by 6 inches deep.

   b. Miter joints for standing trim.

4. Exposed Cabinet Hardware and Accessories: One full-size unit for each type and finish.

E. Full Scale Sample: After shop drawings have been reviewed and prior to fabrication, submit for review by Owner, one 15-inch wide minimum, full size base unit that includes two file base drawers. This unit shall be the standard for materials to be provided within the manufacturer's casework system. This unit may be installed in the final casework.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Manufacturer and Installer.

1. Certificate of Compliance: The manufacturer shall submit a written guarantee certifying complete compliance with all details of this specification. Certificate must be on company letterhead and signed by an individual authorized to legally bind said company.

B. Product Certificates: For the following:

1. Composite wood products.
2. Thermoset decorative panels.
3. High-pressure decorative laminate.
4. Glass.
5. Adhesives.

C. Evaluation Reports: For fire-retardant-treated materials, from ICC-ES.

D. Field quality-control reports.

1.7 CLOSEOUT SUBMITTALS

A. Warranty: Submit written warranty guarantying materials and workmanship to be free from defects for a period of one year from final acceptance.

1. Any items becoming defective during the warranty period shall be repaired or replaced in a timely fashion at no cost to the owner.

2. Any replacements or warranty service shall be guaranteed for one year from the time of acceptance.

1.8 QUALITY ASSURANCE

A. Manufacturer's Qualifications: 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.

1. Single Source Responsibility for Fabrication and Installation: Firm experienced in producing and installing architectural casework similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units without delaying the Work. Manufacturer to assume undivided responsibility for fabricating, finishing, and installing casework specified in this Section.

B. Installer Qualifications: Manufacturer of products.

C. Reference Standard: All materials shall conform to these requirements:

1. Decorative, High Pressure Plastic Laminate: NEMA LD-3.

a. Horizontal Grade .050” = GP50.
b. Post-forming Grade .042” = PF42.
c. Vertical Grade .028 = VG28.
d. Cabinet Linear Grade .020 = CL20.
e. Chemical Resistance Grade .036”.

2. Low Pressure Thermofused Polyester and Melamine Laminates: ALA (American Laminators Association).
3. PVC Edge banding: Seamless roles to be applied with automatic edge banding machines using hot-melt adhesives. Product to be chip proof, flame and moisture resistant.
4. Particleboard: ANSI 208.1 (American National Standards Institute).
5. Softwood Plywood: U.S. Product Standards PS1.
6. Hardwood: ANSI AHA 135.484 (American Hardboard Association)

D. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockups as indicated under ‘Submittals.”

1.9 CASEWORK DEFINITIONS

A. Exposed Portions – Surfaces visible when:

1. Doors and drawers are closed.
2. Cabinets and shelves are open-type or behind clear glass doors.
3. Cabinet tops under 72” above finished floor, or over 72” above finish floor if visible from an upper building level.
4. Visible edges of cabinet ends, doors and drawer fronts.

5. Sloping tops of cabinets are visible.
6. The underside bottoms of wall hung cabinets, where bottom is 42-inches or more above finished floor.
7. Portions of cabinets are visible after fixed appliances are installed.
8. Front edges of cabinet body members are visible or seen through gap of greater than 1/8” with doors or drawers closed.

B. Semi-Exposed Portions – Surfaces visible when:

1. Doors and drawers are open including interior faces of hinged doors.
2. Bottoms of cabinets; where bottom is below 42-inches above finished floor.
3. Portions of bottoms, tops and ends in front of sliding doors in closed position.

C. Concealed Portions - When:

1. Surfaces are not visible after installation.
2. Stretchers, blocking and/or components are concealed by drawers.
3. Underside of bottoms of cabinets less than 30” above the finished floor.
4. Flat tops of cabinets 72” or more above the finished floor, except if visible from an upper building level.

1.10 DELIVERY, STORAGE, AND HANDLING

A. All materials shall be properly protected during transit, distribution and storage. Store in a safe, dry, clean and well-ventilated space, protected from damage, soiling and moisture.

B. Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" in this section.

1.11 FIELD CONDITIONS

A. Environmental Limitations without Humidity Control: Do not deliver or install cabinets 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 cabinets 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.

1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed/concealed by construction and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 ARCHITECTURAL CASEWORK MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:

1. Custom Source Woodworking
2. Generation One Inc.
3. Northwestern Design
4. Pacific Cabinets
5. Modern Custom Woodworking
6. Others only as approved prior to bidding.

2.2 MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.

1. Wood Moisture Content: 8 to 13 percent.

B. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.

1. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade 130.
2. Particleboard (Medium Density): ANSI A208.1, Grade M-2-Exterior Glue.
3. Softwood Plywood: DOC PS 1, 5-ply, solid face, back and core laminated with Type 2 water resistant glue.
4. Hardboard: Standard brown color, smooth two sides, oil impregnated wood fiber, uniform and free of defects. Cabinet backs and drawer bottoms to be provided with 1/4" hardboard smooth one side, painted in semi-exposed color and provided with an acrylic top coat.
5. Thermoset Decorative Panels: Particleboard or MDF finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.

C. Materials used at Exposed Portions:

1. Exposed surfaces shall be high pressure laminate, .028” minimum thickness meeting NEMA LD-3 standards laminated with PVA adhesive under 50 PSI pressure.
2. Countertops shall be finished with .050” thick NEMA grade high pressure plastic laminate except as otherwise required. Countertops to be balanced with backing sheet of .020” thick.
3. Woodgrain patterns shall run vertically on doors, drawer fronts, ends and fixed panels, unless noted otherwise.

D. Materials used at Semi-exposed Portions:

1. Low pressure thermofused melamine meeting ALA standards. Lamination is achieved through self-bonding of the resin under 300 PSI at 320 degrees F.
2. Interior faces of tops, bottoms, ends, partitions, and shelves shall be overlaid with low pressure thermofused melamine laminate or high pressure plastic laminate, as noted above for semi-exposed locations.
3. Cabinet backs and drawer bottoms shall have factory applied coating to both faces. Interior face to match cabinet interior color.
4. Small vertical or horizontal dividers shall be 1/4” thick tempered hardboard, color to match cabinet interior.

E. Materials used at Concealed Portions, Cores and Substrates:

1. Concealed materials shall be any species of sound, dry solid stock, plywood, particleboard, medium density fiberboard, or a combination thereof, unless noted otherwise herein.
2. All materials shall be securely glued with type III adhesive meeting ASTM-D3110 standards.
3. Laminate core material shall be premium grade particleboard, 45 lb. density meeting ANSI-208.1 standards in either fir or pine composition unless specified otherwise under Fabrication

F. Color Selection shall be as follows:

1. As selected by Architect from laminate manufacturer's full range in the following categories:

    a. Solid colors, matte finish.
    b. Wood grains, matte finish.
    c. Patterns, matte finish.

2. Balancing Sheet and Polyester Laminate: As selected by Architect from manufacturer’s full standard offering of colors.
3. PVC Edge Banding: Doellken-Woodtape Edge banding or equivalent. Color as selected by Architect from manufacturer’s full range of colors to match plastic laminate. Up to 10 colors will be selected.
4. Pulls: As selected by Architect from manufacturer’s full standard offering of colors.

2.3 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items specified in Section 08 71 00 "Door Hardware."

B. Exposed Hardware Finish: Except where not available or specified otherwise, provide exposed hardware with BHMA Code 626 satin chrome plate finish (US26D); where not available, provide either satin aluminum, or stainless steel.

C. Butt Hinges: Five knuckle, radius tips 2 ¾” x .083” fastened with 4 screws to end panel and 5 screws to door panel to provide maximum strength, with door opening of 270 degrees. No edge fastening permitted. Provide one pair for doors up to 4 feet height and 1-1/2 pair for doors over 4 feet.

D. Frameless Concealed Hinges (European Type): ANSI/BHMA A156.9, B01602, 170 degrees of opening.

E. Drawer and Door Pulls: Back mounted, 5/16” Bent wire design 96mm x 32mm made of solid brass in satin chrome (US26D) finish, except where noted.

F. Catches: Magnetic catches, Push-in magnetic catches, ANSI/BHMA A156.9, B03131, 7 lb. pull rating with metal base plate and plastic housing to match cabinet interior. Provide two catches on doors over 4 foot height.

G. Adjustable Shelf Standards and Supports:

1. Standards: Cold rolled steel, zinc plated, minimum 5/8” x 3/16” x length as required, with 1/2" adjustments. Larger sizes as required to support shelving live load.
2. Standards shall be recessed into the sides of cabinet for a flush installation.
3. Shelf Clips: Cold rolled steel, zinc plated, minimum 3/4” x 5/8”, compatible with standards. Larger sizes as required to support shelving live load.
4. K&V #255 pilaster standards with #256 pilaster support brackets. Provide for all adjustable shelving and elsewhere as indicated.

H. Shelf Rests: ANSI/BHMA A156.9, B04013; metal

I. Drawer Slides: ANSI/BHMA A156.9.

1. Grade 1 and Grade 2: Side mounted
    a. Type: Full extension.
    b. Material: Zinc-plated steel with ball bearing rollers with positive in and out stops.
2. For drawers not more than 3 inches high and not more than 24 inches wide, provide Grade 1.
3. For drawers more than 3 inches high, but not more than 6 inches high and not more than 24 inches wide, provide Grade 1HD-100.
4. For drawers more than 6 inches high or more than 24 inches wide, provide Grade 1HD-200.
5. For computer keyboard shelves, provide Grade 1HD-100.
6. For trash bins not more than 20 inches high and 16 inches wide, provide Grade 1HD-200.
7. Minimum ratings
    a. Standard Drawers: Full extension, 100 lb. load rating.
    b. Paper Drawers/Flat Files: Full extension, 150 lb. load rating.
    c. File Drawers: Full extension, 150 lb. rating.

J. Slides for Sliding Glass Doors: ANSI/BHMA A156.9, B07063; aluminum.

K. Door and drawer Locks: ANSI/BHMA A156.11, E07121 and E07041. Provide Locks at locations indicated on drawings. Slide bolt used on inactive door.

1. Cabinet locks must be compatible with Snoqualmie Valley School District cylinder cores. Keying as selected. All locks shall be installed with screws from rear eliminating any possibility of lock cylinder rotation.
2. Locks keyed as follows:
    a. All classrooms separate.
    b. All other rooms keyed separate.
    c. One master key to control all locks.
3. Accessories: Provide reinforcing trim spacers and bar strike at each lock.
4. Keys: Provided 3 keys per lock. Keying as determined in keying meeting after review of shop drawings.
5. Slide bolt used on inactive door when pair of doors require lock. Provide two (one each at top and bottom of door) when door height is 24 inches or more.

L. Door and Drawer Silencers: ANSI/BHMA A156.16, L03011.

M. Drawer Accessories:

1. Standard and Lateral Hanging Files: Provide Hafele Hanging File System Accessories for both letter and legal files sizes. Provide top mounted brackets, cross rails, rails and rail clips as required for lateral filing drawers.

N. Tempered Float Glass for Cabinet Doors: ASTM C1048, Kind FT, Condition A, Type I, Class 1 (clear), Quality-Q3, 6 mm thick unless otherwise indicated.

1. Tint Color: Gray
2. Unframed Glass Doors: Seam exposed edges seamed before tempering.

O. Mirror: 1/4” thick polished plate glass mirror. Retainer clips, clear plastic screw mount..

1. Provide 12” x 18” mirror at all Teacher’s Wardrobe Closets.
2. Secure with clear plastic screw mount retainer clips. Locate so center of mirror is 5’-0” above finished floor.

P. Clothes Rod: 1” diameter extruded rigid PVC tube, internally reinforced with steel tube when over 18” long. Supported by injection molded ABS plastic brackets at each end. Color to be selected by Architect.

Q. Grommets for Cable Passage: 3 1/8” OD, molded-plastic grommets and matching plastic caps with slot for wire passage.

1. Color: As selected by Architect from manufacturers full range.

R. Wire Management Angle: “L” shaped metal or plastic angle clip, per manufacturers standard with screw fasteners. Provide continuous full width of all Knee Space countertops.

S. Countertop Support Brackets: 1” tube steel, powder coated bracket to support free countertops with knee space below.

T. Undermount Sink Support Brackets: Steel brackets spanning between cabinet side panels. Must support undermount sink with min. two points of contacts.

U. Casters: For mobile casework, provide 4” full swivel, lockable casters, 300 lb. rating.

V. Coat Hooks:

1. Ceiling mount: 2-prong, 2-1/4” projection, double coat hook, diecast, polished chrome.
2. Wall mount: 2-prong, 1-3/4” projection, diecast, polished chrome.

W. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with ANSI/BHMA A156.18 for ANSI/BHMA finish number indicated.

1. Dark, Oxidized, Satin Bronze, Oil Rubbed: ANSI/BHMA 613 for bronze base; ANSI/BHMA 640 for steel base; match Architect's sample.
2. Bright Brass, Clear Coated: ANSI/BHMA 605 for brass base; ANSI/BHMA 632 for steel base.
3. Bright Brass, Vacuum Coated: ANSI/BHMA 723 for brass base; ANSI/BHMA 729 for zinc-coated-steel base.
4. Satin Brass, Blackened, Bright Relieved, Clear Coated: ANSI/BHMA 610 for brass base; ANSI/BHMA 636 for steel base.
5. Satin Chromium Plated: ANSI/BHMA 626 for brass or bronze base; ANSI/BHMA 652 for steel base.
6. Bright Chromium Plated: ANSI/BHMA 625 for brass or bronze base; ANSI/BHMA 651 for steel base.
7. Satin Stainless Steel: ANSI/BHMA 630.

X. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in ANSI/BHMA A156.9.

2.4 CASEWORK COMPONENTS

A. Cabinet Ends:

1. Semi-exposed ends shall be 3/4” particleboard overlaid with thermos-fused melamine or high pressure plastic laminate on both faces, as applicable.
2. Exposed or finished end shall be 11/16” thick particleboard overlaid with high pressure plastic laminate on both faces to equal 3/4” thickness. Inside color to match cabinet interiors with face color to be selected.
3. Ends shall be routed to receive shelf support standards.
4. Front edge shall be banded with 3mm ABS.
5. Top and bottom edges of upper ends shall be banded with .024” ABS.
6. All upper cabinets noted to be 14 inches deep to have minimum of 12 inches net inside clear dimension with doors closed.

B. Cabinet Tops and Bottoms:

1. Semi-exposed tops and bottoms shall be 3/4” particleboard overlaid with thermos-fused melamine on both faces. Front edge shall be banded with 3mm ABS.
2. Exposed or finished tops and bottoms shall be 11/16” thick particleboard overlaid with high pressure plastic laminate on both faces to equal ¾” thickness. Inside color to match cabinet interiors with exposed color to be selected.
3. Front edging shall be banded with 3mm ABS.

C. Doors:

1. Doors: Shall be 11/16” thick plywood overlaid with a high pressure plastic laminate on both faces to equal 3/4” thickness. Inside color to match cabinet interiors with face color to be selected.
2. Edges: Banded with 3mm ABS.
3. Three hinges on doors over 48” high.

D. Drawers:

1. Fronts: Shall be 11/16” thick plywood overlaid with high pressure plastic laminate on both faces to equal 3/4” thickness. Inside color to match cabinet interiors with face color to be selected.
    a. Edges banded with 3mm ABS. These edges shall be machine applied with hot melt adhesive and trimmed to a radiused corner.
2. Sides: Shall be 1/2” thick plywood overlaid with thermos-fused melamine on two sides to match cabinet interior. Top edges banded with .018 ABS to match interior. Drawer parts joined together with 6mm x 25mm hardwood dowels 32mm on centers.
3. Sub-fronts, and Backs: Shall be 1/2” plywood with factory applied coating to both faces. Bottoms shall be tongued into sides, back and sub-front, glued and clamped to produce a rigid square drawer. Interior face color to match cabinet interiors.
4. Drawer fronts shall be attached to the sub-fronts with minimum of four (4) #8 x 1” panhead screws. Drawer fronts at all drawers in Flat File Base (FFB) cabinets shall be glued to sub-fronts and screwed with eight (8) #8 x 1” panhead screws.
5. Bottom: Prefinished hardboard ¼” thick with smooth uniform face. Provide 3/8” plywood bottoms at all drawers in Flat File Base cabinets.
6. Drawers shall be mounted with positive in and out stops to provide permanent and quiet operation. Drawer fronts that impact cabinet body will not be allowed.
7. Full depth security panel shall be provided between all drawers when individual drawer locking is required.

E. Fixed and Adjustable Shelves:

1. The following materials and thickness shall be used:
    a. Shelves at cabinets up to 31” wide shall be 3/4” thick particleboard
    b. Shelves at cabinets over 31” up to 41” wide shall be 1” thick particleboard.
    c. Shelves at cabinets over 41” up to 48” wide shall be 1 1/8” plywood.
    d. Shelves at exposed locations shall be overlaid with high pressure plastic laminate on both faces.
    e. Shelves at semi-exposed locations shall be overlaid with thermos-fused melamine on both faces.
    f. Front edge shall be banded with 3mm ABS.
    g. Band back and side edges with 0.024 inch ABS.
2. Adjustable shelves shall be supported on metal standards, two rows each side of shelf in cabinets up to 30” deep and three rows each side in cabinets over 30’ deep. Provide metal shelf clips, 4 shelf clips in cabinets up to 30” deep and 6 shelf clips in cabinets greater than 30” deep.

F. Cabinet Backs:

1. Semi-exposed backs shall be 1/2" particleboard with factory applied coating to both faces. Interior face to match cabinet interior color. Semi-exposed edge shall be banded with .018" ABS.
2. Exposed or finish backs shall be 11/16" particleboard overlaid with high pressure plastic laminate on both faces to equal 3/4" thickness.
3. Bottom edge of upper backs shall be banded with .018" ABS.

G. Partitions and Dividers:

1. Vertical partitions at exposed locations shall be 1/2" particleboard overlaid with high pressure plastic laminate on both faces. Exposed faces banded with .018" ABS.
2. Vertical partitions at semi-exposed locations shall be 1/2" particleboard overlaid with thermos-fused melamine. Exposed faces banded with .018" ABS.
3. Small dividers shall be premium grade 1/4" tempered hardboard and supported by adjustable clips or grooved into adjacent members. Edges shall be sanded.

H. Cabinet Bases:

1. Provide every base and tall cabinet with its own unit base, factory applied. End panels of cabinet to be supported directly by base to transfer shelf load to building structure.

I. Filler and Soffit Panels:

1. Panels shall be made of 11/16" particleboard overlaid with high pressure plastic laminate on both faces to equal 3/4" thick and shall be fitted to adjacent surfaces.
2. Exposed faces shall have laminate matching adjacent cabinets.

J. Plastic Laminate Countertops:

1. See Section 12 36 24 Plastic Laminate Countertops

K. Epoxy Resin Countertops

1. See Section 12 36 53 Laboratory Worksurfaces

2.5 PLASTIC LAMINATED WINDOW STOOLS

1. Material: GP50 NEMA grade decorative laminate bonded to 3/4" exterior grade plywood substrate.
2. Finished Edges and Ends: Shall be trimmed with GP50 decorative laminate applied after top surface. Face thickness shall be as detailed, or 1-1/2" if not detailed.
3. Lengths: Shall be furnished in longest possible lengths. When joints are required, they shall be factory prepared with a minimum of four 1/4 inch joint bolts each. Joints shall be field assembled with waterproof-sealant to insure stable and rigid construction. No joints allowed within 24 inches of ends of sills.

2.6 PLASTIC LAMINATED WALL PANEL

1. Plastic Laminated Wall Panel: Decorative, high pressure plastic laminate; NEMA LD-3, grade GP50 on 1/2" medium density fiberboard. Color and pattern as selected by Architect from manufacturer's full line of plastic laminates.
2. Adhesives: Manufacturers recommended adhesive for bonding to specified substrate.
3. Finished Edges and Ends: Shall be trimmed with GP50 decorative laminate applied after top surface on all exposed edges and ends.

2.7 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: See architectural drawings, typical details.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

C. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement.

1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.8 FABRICATION

A. Fabricate architectural cabinets to dimensions, profiles, and details indicated.

B. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

1. Notify Architect seven days in advance of the dates and times architectural cabinet fabrication will be complete.
2. Trial fit assemblies at manufacturer's 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.

C. Laminating: All laminating and fabrication shall be performed in a heated and humidity conditioned environment to prevent shrinkage, warpage and delaminations. All substrates and finish materials shall be stored in this environment a minimum of 48 hours prior to processing. Maintain a minimum of 60o F. and between 40% and 60% relative humidity.

D. All parts shall be accurately machined and fit for square and true cases. Case joints shall be dowelled with a minimum of six (6) 10mm hardwood fluted dowels per 24-inch deep cabinet joint, and shall be glued and clamped. All backs shall be dadoed into cabinet ends and furnished with 3/4-inch x 2-1/2 inch composition board rails at the top and

bottom, the full width of cabinet, concealed behind back. Rails are to be provided at a maximum spacing of 42-inches on center.

E. Toe kicks shall be continuous or at manufacturer's option, end panels shall be notched to form toe kick at 4-inches high. Toe-kick base shall be constructed of moisture resistant materials (no particle board materials).

F. All base units to have a 3/4-inch solid sub-top, except for sink cabinets which shall be provided with 4" wide front to back rails at each side.

G. All sink cabinets to be provided with removable backs.

H. All edges on underside of wall hung cabinets shall be edge banded.

I. Shop-cut openings to maximum extent possible to receive hardware, appliances, 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.

J. Install glass to comply with applicable requirements in Section 08 80 00 "Glazing" and in GANA's "Glazing Manual."

1. For glass in frames, secure glass with removable stops.
2. For exposed glass edges, polish and grind smooth.

PART 3 - EXECUTION

3.1 FABRICATION, GENERAL

A. Fabricate casework to dimensions, profiles, and details indicated, with reasonable deviation for manufacturer’s standard sizes and modules. Clearly identify all deviations on shop drawings and highlight for Architect’s review. Deviations shall not change the design intent and must fully meet all code requirements, including but not limited to handicapped accessibility.

B. Complete fabrication, including assembly, finishing, and hardware application, before shipment to project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

3.2 EXAMINATION

A. The installer shall examine the substrate and the temperature and humidity conditions under which the work under this Section is to be performed and notify the Contractor in writing of unsatisfactory conditions.

3.3 PREPARATION

A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

B. The installer shall examine the substrate and the temperature and humidity conditions under which the work under this Section is to be performed and notify the Contractor in writing of unsatisfactory conditions.

C. Do not proceed with work under this Section until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.4 INSTALLATION

A. Deliver materials in manufacturer's unopened containers or packaging and comply with manufacturer's instructions for storage and handling.

B. Architectural Woodwork Standards: Install cabinets to comply with quality standard grade of item to be installed.

1. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.
2. All work in this Section shall be installed under the control and supervision of the casework manufacturer with factory-trained mechanics in his employ.
3. Conform to governing codes and ordinances for all installation and anchorage requirements.
4. Install all casework to true horizontal and plumb lines, in perfect alignment. Install to a tolerance of 1/8-inch-in-96-inches, using concealed shims, for plumb and level (including tops); and with no variations in flushness of adjoining surfaces.
5. Install cabinets without distortion so that doors and drawers fit openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated.
6. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c.
7. Anchor tops securely to base units and other support systems as indicated.
8. Anchor backsplashes and end splashes securely and set in clear acrylic caulking.
9. Scribe and cut casework to fit adjoining work. Refinish cut surfaces and repair damaged finish at cuts.
10. Fill or cover by approved means all gaps and top of tall and upper cabinet units where they adjoin back and end walls, thus preventing the possibility of paper falling behind these units.

C. Attachment, General

1. All casework items shall be securely anchored to building structure, except freestanding, moveable, or mobile units which are to be adjusted to prevent any rocking when sitting on finish floor.
2. Primary anchorage of base and wall cabinets shall be through the cabinet back into wall framing or blocking furnished under other sections. Additional anchorage will be made into cabinet bases and adjacent side walls where they occur. All anchorage to be concealed when doors and drawers are closed. Appropriately sized anchor screws shall be used to best attach to the existing wall condition which will allow each cabinet to be loaded to a capacity of 50 lb. per sq. ft. of shelf area.

3. All installation shall be in strict conformance with seismic codes.
4. At free-spanning countertops or work surfaces, steel countertop support brackets are to be provided at a maximum spacing of 32 inches, or as shown on the drawings where less. Support brackets are to be designed to allow for knee space clearance and attach to wall framing or blocking for support.

D. Connection of Adjoining Units

1. Where several units are installed in-line, drill through end panels and secure by bolting using “T” nuts, bolts and finishing washers or set bolts with finishing washers, or approved connection system.
2. Countertops shall be continuous over units below unless noted otherwise for specific locations or types of units.

E. Anchorage to Floor:

1. Anchor casework with countersunk, concealed fasteners as required for a complete installation. Bolt units for file drawers, and units set out from wall to accommodate piping through bottom and suitably anchor to floor.

F. Window Sills: Anchor securely to sill framing. Caulk space between sills and gypsum board and window frame.

1. Install sills with no more than 1/8 inch in 96 inch sag, bow, or other variation from a straight line.
2. Secure sills with adhesive and fasten as recommended by the sill manufacturer.

G. Workmanship:

1. Erect casework straight, level, plumb and true.
2. Neatly scribe casework to walls, soffits and columns. Fillers to color match adjacent surfaces and will not be permitted in excess of 1-1/2” wide, unless shown on drawings or approved in advance by the Architect.
3. Cap off wall and corner scribes to close gaps at top and bottom of cabinets.
4. Attach countertops securely to base units. Spline and glue joints in countertops; provide concealed mechanical clamping of joint.
5. Joints are not permitted in continuous countertops over knee spaces or within 24 inches of sinks or counter ends. Joints where approved, are to be tight, in perfect alignment, and not allowing excessive deflection. Seal countertop and/or backsplash to walls.

3.5 COORDINATION

A. Provide cutting and fitting as necessary to accommodate mechanical, plumbing and electrical work built into casework units.

B. Provide alterations to casework to keep devices accessible when they are covered by casework. This includes mechanical and electrical switches, receptacles, panels, access doors and other devices.

3.6 ADJUSTING AND CLEANING

A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural cabinets. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware. Adjust doors, drawers, hardware fitting and other moving or operating parts to function smoothly and correctly.

C. Clean all work installed in this section. Wipe all surfaces with damp cloth, remove stains, stickers and other foreign matter. Remove from site all trash, packing material, material scraps and other debris related to the work of this section.

D. Clean cabinets on exposed and semi-exposed surfaces.

E. Touch up abraded factory-finished surfaces to match original finish.

3.7 PROTECTION

A. Provide final protection and maintain conditions in a manner acceptable to Fabricator and Installer to ensure manufactured casework remains without damage or deterioration until time of Substantial Completion.

END OF SECTION 12 32 00

SECTION 12 36 24 – PLASTIC LAMINATE COUNTERTOPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. The Section includes all labor, equipment, hardware and materials to furnish and install plastic laminate countertops. This includes but is not limited to related items to provide a complete installation. Cut-outs for sinks, fixtures and appliances are also part of this Section.

B. Section Includes

1. Furnish and install all countertops, back splashes, and other similar applications unless specifically noted for inclusion under another Section. Countertops shall be assumed to be provided at all base cabinets under 60 inches above finished floor, whether shown or called out or not. Unless noted otherwise, these tops shall be assumed to have a plastic laminate finish. Where called out, or where graphically depicted (even if not called out), provide a back splash and end return back splashes, finished the same as the countertop. Unless noted otherwise, back splashes shall be 4 inches high, and shall be adhered to a 3/4” inch thick backing material, as specified herein.

   Unless noted otherwise, countertops that are open below shall be provided with painted steel support brackets as required to properly support the counter and to provide handicapped accessible knee space.

   a. See drawings for type and style required.
   b. Completely coordinate with work of all other trades.

2. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

3. Countertops items shall meet or exceed the standard of construction and material quality set forth in the references AWI standards.

4. Manufacturers shall alter their countertops as necessary to suit building dimensions, and to suit equipment to be installed adjacent thereto.

5. Wood furring, blocking, shims, and hanging strips for installing countertops that are not concealed within other construction.

C. Related Requirements:

1. Section 06 10 00 "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets that are concealed within other construction before cabinet installation.
2. Section 07 92 00 “Joint Sealers” for miscellaneous Joint sealers.

3. Section 09 29 00 “Gypsum Board” for Cementitious backer unit substrate.
4. Section 12 32 00 “Manufactured Casework"
5. Divisions 21, 22 & 23 for possible fire suppression, sinks, faucets and other plumbing fixtures and piping, ductwork and other misc. items within these sections.
6. Divisions 26, 27 & 28. for possible electrical items, communication items, electrical safety and security items and other misc. items within these sections.

1.3 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct preinstallation meeting as part of general construction meeting or separately as necessary concurrent with casework preinstallation meeting.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For plastic-laminate-clad countertops.

1. Submit complete shop drawings with elevations minimum 1/4" = 12" or larger. Floor plans to be 1/4" = 12" or larger, sections and details to be 1-1/2" = 12" or larger.
2. Show sizes, dimensions and connections to other items for coordination with other trades.
3. Show complete details of construction.
4. Show locations and sizes of furring, and blocking, including concealed blocking and reinforcement specified in other Sections.
5. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets and other items installed in casework.
6. Show location(s) of each item, dimensioned plans and elevations, large scale details, attachment devices and other components. Locate sink centerlines for guidance of other trades.

C. Samples: Plastic laminates in each type, color, pattern, and surface finish required in manufacturer's standard size.

D. Samples for Initial Selection: For plastic laminates.

E. 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.
3. Fabrication Sample: For each type and profile of countertop required, provide one sample applied to core material with specified edge material applied to one edge.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Manufacturer and Installer.

1. Certificate of Compliance: The manufacturer shall submit a written guarantee certifying complete compliance with all details of this specification. Certificate must be on company letterhead and signed by an individual authorized to legally bind said company.

B. 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.

C. Evaluation Reports: For fire-retardant-treated materials, from ICC-ES.

1.7 CLOSEOUT SUBMITTALS

A. Warranty: Submit written warranty guarantying materials and workmanship to be free from defects for a period of one year from final acceptance.

1. Any items becoming defective during the warranty period shall be repaired or replaced in a timely fashion at no cost to the owner.
2. Any replacements or warranty service shall be guaranteed for one year from the time of acceptance.

1.8 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.

1. Single Source Responsibility for Fabrication and Installation: Firm experienced in producing and installing architectural casework similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units without delaying the Work. Manufacturer to assume undivided responsibility for fabricating, finishing, and installing casework specified in this Section.

2. Quality Standard: Except as otherwise indicated, comply with the following standard:

a. AWI Quality Standard: “Architectural Woodwork Quality Standards” of the architectural Woodwork Institute for grades of interior architectural casework, construction, finishes, and other requirements.

b. The Contract Documents contain selections chosen from options in the Quality Standard as well as additional requirements beyond those of the Quality Standard. Comply with such selections and requirements in addition to the Quality Standard.

B. Installer Qualifications: Fabricator of products.

1.9 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.

1.10 DELIVERY, STORAGE, AND HANDLING

A. All materials shall be properly protected during transit, distribution and storage. Store in a safe, dry, clean and well-ventilated space, protected from damage, soiling and moisture.

B. Do not deliver countertops until painting and similar finish operations that might damage countertops have been completed in installation areas. Store countertops in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" in this section.

1.11 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 FABRICATORS

A. Fabricators: Subject to compliance with requirements, available fabricators offering products that may be incorporated into the Work include, but are not limited to, the following]:

1. Custom Source Woodworking
2. Generation One Inc.
3. Northwestern Design
4. Pacific Cabinets
5. Modern Custom Woodworking

6. Others only as approved prior to bidding.

2.2 PLASTIC-LAMINATE-CLAD COUNTERTOPS

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of plastic-laminate-clad countertops indicated for construction, finishes, installation, and other requirements.

1. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.

B. Grade: Premium.

C. High-Pressure Decorative Laminate: NEMA LD 3.

D. Chemical-Resistant, High-Pressure Decorative Laminate: NEMA LD 3, Grade HGP, and as follows:

1. Laminate has the following ratings when tested with indicated reagents according to NEMA LD 3, Test Procedure 3.9.5:

a. Nitric Acid (30 Percent): Moderate effect.
b. Sulfuric Acid (77 Percent): Moderate effect.
c. Hydrochloric Acid (37 Percent): Moderate effect.
d. Phosphoric Acid (75 Percent): No effect.
e. Acetic Acid (98 Percent): No effect.
f. Formaldehyde: No effect.
g. Ethyl Acetate: No effect.
h. Ethyl Ether: No effect.
i. Phenol (85 Percent): Moderate effect.
j. Benzene: No effect.
k. Xylene: No effect.
l. Butyl Alcohol: No effect.
m. Furfural: No effect.
n. Methyl Ethyl Ketone: No effect.
o. Sodium Hydroxide (25 Percent): No effect.
p. Sodium Sulfide (15 Percent): No effect.
q. Ammonium Hydroxide (28 Percent): No effect.
r. Zinc Chloride: No effect.
s. Gentian Violet: No effect.
t. Methyl Red: No effect.

E. 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.

2. As selected by Architect from manufacturer's full range in the following categories:

a. Solid colors, matte finish.

b. Solid colors with core same color as surface, matte finish.

c. Wood grains, matte finish with grain running parallel to length of countertop.

d. Patterns, matte finish.

F. Edge Treatment: Same as laminate cladding on horizontal surfaces.

G. Core Material: Particleboard or plywood substrate.

H. Core Material at Sinks: MDF made with exterior glue or exterior-grade plywood.

I. Core Thickness: 3/4 inch (unless otherwise indicated on drawings).

1. Build up countertop thickness to 1-1/2 inches at front, back, and ends with additional layers of core material laminated to top.

J. Backer Sheet: Provide plastic-laminate backer sheet, NEMA LD 3, Grade BKL, on underside of countertop substrate.

K. Paper Backing: Provide paper backing on underside of countertop substrate.

2.3 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard unless otherwise indicated.

1. Wood Moisture Content: 8 to 13 percent.

B. 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. MDF: Medium-density fiberboard, ANSI A208.2, Grade 130.
2. Particleboard: ANSI A208.1 Grade M-2-Exterior Glue.
3. Softwood Plywood: DOC PS 1.

2.4 ACCESSORIES

A. Wire-Management Grommets: Circular, molded-plastic grommets and matching plastic caps with slot for wire passage.

1. Outside Diameter: 3 1/8”.
2. Color: As selected by Architect from manufacturers full range.
3. Paper Slots: 12 inches long by 1-3/4 inches wide by 1 inch deep; molded-plastic, paper-slot liner with 1/4-inch lip.
4. Color: As selected by Architect from manufacturers full range..

2.5 MISCELLANEOUS MATERIALS

A. Adhesive for Bonding Plastic Laminate: As selected by fabricator to comply with requirements.

1. Adhesive for Bonding Edges: Hot-melt adhesive.

2.6 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.

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 FABRICATION, GENERAL

A. Fabricate casework to dimensions, profiles, and details indicated, with reasonable deviation for manufacturer’s standard sizes and modules. Clearly identify all deviations on shop drawings and highlight for Architect’s review. Deviations shall not change the design intent and must fully meet all code requirements, including but not limited to handicapped accessibility.

B. Complete fabrication, including assembly, finishing, and hardware application, before shipment to project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

3.2 EXAMINATION

A. The installer shall examine the substrate and the temperature and humidity conditions under which the work under this Section is to be performed and notify the Contractor in writing of unsatisfactory conditions.

3.3 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.

3.4 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.
2. No joints within 24” of any countertop cut out.

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 tops with concealed metal brackets at 16 inches o.c. and to walls with adhesive.
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. Countertop Installation over open knee space:

1. Provide steel countertop support brackets at a maximum spacing of 32 inches, or as shown on the drawings where less. Support brackets are to be designed to allow for knee space clearance and attach to wall framing or blocking for support.
2. Provide adequate ledgers at back and necessary front aprons to eliminate deflection of countertop at open knee spaces.

3.5 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 semi-exposed surfaces.

3.6 PROTECTION

A. 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 12 36 24

SECTION 12 48 13 - ENTRANCE FLOOR MATS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Resilient entrance mats.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

   1. Material descriptions, dimensions of individual components and profiles, and finishes for floor mats.

B. Samples: For the following products, in manufacturer's standard sizes:

   1. Floor Mat in manufactures’ standard color range.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For floor mats to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 ENTRANCE FLOOR MATS, GENERAL

A. Accessibility Standard: Comply with applicable provisions in the DOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

2.2 RESILIENT ENTRANCE MATS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. American Floor Mats.

B. WaterGuard Classic Entrance Mats.

C. Carpet-Type Mats: Polypropylene carpet bonded to 1/4-inch-thick, flexible rubber backing to form mats 7/16 inch thick with rubber border.

1. Colors, Textures, and Patterns: As selected by Architect from full range of industry colors.
2. Mat Size: As indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and floor conditions for compliance with requirements for location, sizes, and other conditions affecting installation of floor mats.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install surface-type units to comply with manufacturer's written instructions, coordinate with entrance locations and traffic patterns.

END OF SECTION 12 48 13

SECTION 22 05 53
IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Nameplates.

2. Tags.

3. Pipe markers.

1.02 REFERENCES

A. American Society of Mechanical Engineers:

1. ASME A13.1 - Scheme for the Identification of Piping Systems.

B. National Fire Protection Association:

1. NFPA 99 - Standard for Health Care Facilities.

1.03 SUBMITTALS

A. Product Data: Submit manufacturers catalog literature for each product required.

B. Shop Drawings: Submit list of wording, symbols, letter size, and color coding for mechanical identification and valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.

C. Manufacturer's Installation Instructions: Indicate installation instructions, special procedures, and installation.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.04 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of tagged valves; include valve tag numbers.

1.05 QUALITY ASSURANCE

A. Conform to NFPA 99 requirements for labeling and identification of medical gas piping systems and accessories.

B. Conform to ASME A13.1 for color scheme for identification of piping systems and accessories.

C. Maintain one copy of each document on site.

PART 2 - PRODUCTS

2.01 NAMEPLATES

A. Manufacturers:

1. Brady

2. Brimar

B. Product Description: Laminated three-layer plastic with engraved white letters on dark contrasting background color.

2.02 TAGS

A. Manufacturers:

1. Brady

2. Brimar

B. Plastic Tags:

1. Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inches diameter.

C. Metal Tags:

1. Brass with stamped letters; tag size minimum 1-1/2 inches diameter with finished edges.

D. Information Tags:

1. Clear plastic with printed "Danger," "Caution," or "Warning" and message; size 3-1/4 x 5-5/8 inches with grommet and self-locking nylon ties.

E. Tag Chart: Typewritten letter size list of applied tags and location plastic laminated.

2.03 PIPE MARKERS

A. Manufacturers:

1. Brimar

2. Brady Model B-946

B. Color and Lettering: Conform to ASME A13.1.

C. Plastic Pipe Markers:

1. Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering. Larger sizes may have maximum sheet size with spring fastener.

D. Plastic Tape Pipe Markers:

1. Manufacturers:

a. Brady Model B-946

2. Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

E. Plastic Underground Pipe Markers:

1. Bright colored continuously printed plastic ribbon tape, minimum 6 inches wide by 4 mil thick, manufactured for direct burial service.

PART 3 - EXECUTION

3.01 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.02 INSTALLATION

A. Install identifying devices after completion of coverings and painting.

B. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive.

C. Install labels with sufficient adhesive for permanent adhesion and seal with clear lacquer. For unfinished canvas covering, apply paint primer before applying labels.

D. Install tags using corrosion resistant chain. Number tags consecutively by location.

E. Install underground plastic pipe markers 6 to 8 inches below finished grade, directly above buried pipe.

F. Install piping identification on medical gas systems.

G. Identify water heaters, pumps, tanks, and water treatment devices with plastic nameplates. Identify in-line pumps and other small devices with tags.

H. Identify control panels and major control components outside panels with plastic nameplates.

I. Identify valves in main and branch piping with tags.

J. Identify piping, concealed or exposed, with plastic pipe markers. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction.

K. Provide ceiling tacks to locate valves above T-bar type panel ceilings. Locate in corner of panel closest to equipment.

END OF SECTION 22 05 53

SECTION 22 07 00
PLUMBING INSULATION

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Piping system insulation.
2. Equipment insulation.
3. Pipe insulation jackets.
4. Equipment insulation jackets.
5. Insulation accessories including vapor retarders and accessories.

B. Related Sections:

1. Section 22 05 53 - Identification for Plumbing Piping and Equipment: Product requirements for plumbing piping and equipment identification.

1.02 REFERENCES

A. ASTM International:

1. ASTM A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
2. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
3. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
4. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement.
5. ASTM C449/C449M - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement.
6. ASTM C518 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
7. ASTM C533 - Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation.
8. ASTM C534 - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.
9. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation.
10. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation.

11. ASTM C591 - Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation.

12. ASTM C592 - Standard Specification for Mineral Fiber Blanket Insulation and Blanket-Type Pipe Insulation (Metal-Mesh Covered) (Industrial Type).

13. ASTM C610 - Standard Specification for Molded Expanded Perlite Block and Pipe Thermal Insulation.

14. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation.

15. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.

16. ASTM C921 - Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.

17. ASTM C1126 - Standard Specification for Faced or Unfaced Rigid Cellular Phenolic Thermal Insulation.

18. ASTM C1136 - Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation.

19. ASTM C1290 - Standard Specification for Flexible Fibrous Glass Blanket Insulation Used to Externally Insulate HVAC Ducts.

20. ASTM D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

21. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

22. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.

1.03 SUBMITTALS

A. Product Data: Submit product description, thermal characteristics and list of materials and thickness for each service, and location.

B. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.

B. Protect insulation from weather and construction traffic, dirt, water, chemical, and damage, by storing in original wrapping.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Install insulation only when ambient temperature and humidity conditions are within range recommended by manufacturer.

B. Maintain temperature during and after installation for minimum period of 24 hours.

1.06 WARRANTY

A. Furnish one year manufacturer warranty for man made fiber.

PART 2 - PRODUCTS

2.01 GLASS FIBER - PIPE INSULATION

A. Manufacturers:

1. Knauf.
2. Owens Corning SSL II
3. Johns Manville Micro-Lok

B. Insulation: ASTM C612; rigid, noncombustible.

1. 'K' factor: ASTM C177 or ASTM C518, 0.24 at 75 degrees F.
2. Maximum Service Temperature: 850 degrees F.
3. Maximum Moisture Absorption: Less than 5% by weight.
4. Min. Density: 3.5 lb/cu ft.

C. Vapor Retarder Jacket: ASTM C1136 Flexible, Low Permeance Vapor Retarders for Thermal Insulation, Type II.

D. Facing: 1 inch galvanized steel hexagonal wire mesh stitched on one face of insulation.

E. Vapor Retarder Lap Adhesive:

1. Manufacturer:
   a. Foster Model 85-20.
   b. Childers Vi-Cryl
2. Compatible with insulation.

F. Insulating Cement/Mastic:

1. Manufacturer: Johns Manville Model 460.
2. ASTM C195; hydraulic setting on mineral wool.

G. Molded Expanded Perlite Block and Pipe Insulation: ASTM C610, Pipe Insulation.

2.02 PIPE INSULATION AND EQUIPMENT JACKETS

A. PVC Plastic Pipe Jacket:

1. Manufacturers:

    a. Knauf.

    b. Owens Corning.

    c. Johns Manville Zeston 2000 PVC

2. Product Description: ASTM D1784, One piece molded type fitting covers and sheet material, off-white color.

3. Thickness: 30 mil.

4. Connections: Brush on welding adhesive.

5. Canvas Equipment Jacket:

    a. UL listed.

    b. Fabric: 6 oz/sq yd, plain weave cotton.

6. Fire retardant lagging adhesive. Composite of insulation, jacket and lagging adhesive having flame spread index not greater than 25 and smoke developed index not greater than 50 when tested to ASTM E84.

    a. Lagging Adhesive:

        1) Manufacturers:

            a) Foster 30-36.

            b) Substitutions: Section 01 60 00 - Product Requirements.

            c) Compatible with insulation.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify piping and equipment has been tested before applying insulation materials.

B. Verify surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION

A. Exposed Piping: Locate insulation and cover seams in least visible locations.

B. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.

C. Man made mineral fiber insulated pipes conveying fluids below ambient temperature:

1. Furnish factory-applied or field-applied vapor retarder jackets. Secure factory-applied jackets with pressure sensitive adhesive self-sealing longitudinal laps and butt strips.

Secure field-applied jackets with outward clinch expanding staples and seal staple penetrations with vapor retarder mastic.

2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor retarder adhesive or PVC fitting covers.

D. Man made mineral fiber insulated pipes conveying fluids above ambient temperature:

1. Furnish factory-applied or field-applied standard jackets. Secure with outward clinch expanding staples or pressure sensitive adhesive system on standard factory-applied jacket and butt strips or both.

2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.

E. Inserts and Shields:

1. Application: Piping or Equipment 1-1/2 inches, diameter or larger.

2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.

3. Insert location: Between support shield and piping and under finish jacket.

4. Insert configuration: Minimum 6 inches long, of thickness and contour matching adjoining insulation; may be factory fabricated.

5. Insert material: Compression resistant insulating material suitable for planned temperature range and service.

F. Continue insulation through penetrations of building assemblies or portions of assemblies having fire resistance rating of one hour or less. Provide intumescent firestopping when continuing insulation through assembly. Finish at supports, protrusions, and interruptions. Refer to Section 07 84 00 for penetrations of assemblies with fire resistance rating greater than one hour.

G. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces: Finish with PVC jacket and fitting covers.

H. Exterior Applications: Provide vapor retarder jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor retarder cement. Cover with aluminum jacket with seams located at 3 or 9 o’clock position on side of horizontal piping with overlap facing down to shed water or on bottom side of horizontal equipment.

I. Buried Piping: Insulate only where insulation manufacturer recommends insulation product may be installed in trench, tunnel or direct buried. Install factory fabricated assembly with inner all-purpose service jacket with self-sealing lap, and asphalt impregnated open mesh glass fabric, with 1 mil thick aluminum foil sandwiched between three layers of bituminous compound; outer surface faced with polyester film.

J. Heat Traced Piping: Insulate fittings, joints, and valves with insulation of like material, thickness, and finish as adjoining pipe. Size insulation large enough to enclose pipe and heat tracer. Cover with aluminum jacket with seams located at 3 or 9 o’clock position on side of horizontal piping with overlap facing down to shed water.

K. Factory Insulated Equipment: Do not insulate.

L. Exposed Equipment: Locate insulation and cover seams in least visible locations.

M. Apply insulation close to equipment by grooving, scoring, and beveling insulation. Fasten insulation to equipment with studs, pins, clips, adhesive, wires, or bands.

N. Fill joints, cracks, seams, and depressions with bedding compound to form smooth surface. On cold equipment, use vapor retarder cement.

O. Insulated equipment containing fluids below ambient temperature: Insulate entire system.

P. Mineral fiber insulated equipment containing fluids below ambient temperature: Provide vapor retarder jackets, factory-applied or field-applied. Finish with glass-cloth and vapor barrier adhesive.

Q. For hot equipment containing fluids over 140 degrees F, insulate flanges and unions with removable sections and jackets.

R. Mineral fiber insulated equipment containing fluids above ambient temperature: Provide standard jackets, with or without vapor retarder, factory-applied or field-applied. Finish with glass cloth and adhesive.

S. Finish insulation at supports, protrusions, and interruptions.

T. Equipment in Mechanical Equipment Rooms or Finished Spaces: Finish with PVC jacket and fitting covers.

U. Nameplates and ASME Stamps: Bevel and seal insulation around; do not insulate over.

V. Equipment Requiring Access for Maintenance, Repair, or Cleaning: Install insulation for easy removal and replacement without damage.

3.03 INTERIOR INSULATION APPLICATION SCHEDULE

A. Service: Domestic hot and recirculated hot water.

1. Insulation Material: Mineral-fiber, preformed.

2. Insulation Thickness: Apply the following insulation thicknesses:

a. Pipe, 1/2-inch – 1-1/4-inch: 1-inch.

b. Pipe, 1-1/2-inch and above: 1-1/2-inch.

3. Vapor Retarder Required: No.

4. Insulation Conductivity Range: 0.24 – 0.28 BTU·in/(hr·ft^{2}·°F).

B. Service: Domestic cold water.

1. Insulation Material: Mineral-fiber, preformed.

2. Insulation Thickness: 1/2-inch.

a. Pipe, 1/2-inch – 1-1/4-inch: 1/2-inch.

b. Pipe, 1-1/2-inch and above: 1-inch.

3. Vapor Retarder Required: Yes.

4. Insulation Conductivity Range: 0.23 – 0.27 BTU·in/(hr·ft^{2}·°F).

C. Service: Rainwater conductors.

1. Insulation Material: Mineral-fiber, preformed.

2. Insulation Thickness: 1/2-inch.

3. Vapor Retarder Required: Yes.

D. Service: Roof drain bodies.

1. Insulation Material: Mineral-fiber, blanket.

2. Insulation Thickness: 1/2-inch.

3. Vapor Retarder Required: Yes.

E. Service: Sanitary waste piping where heat tracing is installed.

1. Insulation Material: Mineral-fiber, preformed.

2. Insulation Thickness: 1-1/2-inch.

3. Vapor Retarder Required: Yes.

F. Service: Condensate drain piping.

1. Insulation Material: Flexible elastomeric.

2. Insulation Thickness: 1-inch.

3. Vapor Retarder Required: Yes.

3.04 EXTERIOR INSULATION APPLICATION SCHEDULE

A. This application schedule is for aboveground insulation outside the building.

B. Service: Domestic water.

1. Insulation Material: Cellular glass.

2. Insulation Thickness: 1-1/2-inch.

3. Vapor Retarder Required: Yes.

4. Insulation Conductivity Range: 0.23 – 0.27 BTU·in/(hr·ft^{2}·°F).

C. Service: Storm water.

1. Insulation Material: Cellular glass.
2. Insulation Thickness: 1-1/2-inch.
3. Vapor Retarder Required: Yes.

3.05 INSULATION SCHEDULE

A. Piping to be insulated:

1. All domestic cold water piping
2. All domestic hot water piping.
3. All domestic hot water recirculating piping.

END OF SECTION 22 07 00

SECTION 22 11 00
FACILITY WATER DISTRIBUTION

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Domestic water piping, above grade.
2. Unions and flanges.
3. Valves.
4. Pipe hangers and supports.
5. Water hammer arrestors.
6. Trap Primers.

B. Related Sections:

1. Section 22 05 53 - Identification for Plumbing Piping and Equipment: Product requirements for pipe identification and valve tags for placement by this section.
2. Section 22 07 00 - Plumbing Insulation: Product and execution requirements for pipe insulation.

1.02 REFERENCES

A. American National Standards Institute:

1. ANSI Z21.22 - Relief Valves for Hot Water Supply Systems.

B. American Society of Mechanical Engineers:

1. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
2. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
3. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes.
4. ASME B31.9 - Building Services Piping.
5. ASME B40.1 - Gauges - Pressure Indicating Dial Type - Elastic Element.
6. ASME Section VIII - Boiler and Pressure Vessel Code - Pressure Vessels.
7. ASME Section IX - Boiler and Pressure Vessel Code - Welding and Brazing Qualifications.

C. American Society of Sanitary Engineering:

1. ASSE 1010 - Performance Requirements for Water Hammer Arresters.

2. ASSE 1011 - Performance Requirements for Hose Connection Vacuum Breakers.

3. ASSE 1012 - Performance Requirements for Backflow Preventer with Intermediate Atmospheric Vent.

4. ASSE 1013 - Performance Requirements for Reduced Pressure Principle Backflow Preventers and Reduced Pressure Fire Protection Principle Backflow Preventers.

5. ASSE 1019 - Performance Requirements for Vacuum Breaker Wall Hydrants, Freeze Resistant, Automatic Draining Type.

D. ASTM International:

1. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

2. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.

3. ASTM A395/A395M - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.

4. ASTM A536 - Standard Specification for Ductile Iron Castings.

5. ASTM B32 - Standard Specification for Solder Metal.

6. ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes.

7. ASTM B88 - Standard Specification for Seamless Copper Water Tube.

8. ASTM B584 - Standard Specification for Copper Alloy Sand Castings for General Applications.

E. American Welding Society:

1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.

F. Manufacturers Standardization Society of the Valve and Fittings Industry:

1. MSS SP 58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.

2. MSS SP 67 - Butterfly Valves.

3. MSS SP 69 - Pipe Hangers and Supports - Selection and Application.

4. MSS SP 70 - Cast Iron Gate Valves, Flanged and Threaded Ends.

5. MSS SP 71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends.

6. MSS SP 78 - Cast Iron Plug Valves, Flanged and Threaded Ends.

7. MSS SP 80 - Bronze Gate, Globe, Angle and Check Valves.

8. MSS SP 85 - Cast Iron Globe & Angle Valves, Flanged and Threaded.

9. MSS SP 89 - Pipe Hangers and Supports - Fabrication and Installation Practices.

10. MSS SP 110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

G. Plumbing and Drainage Institute:

1. PDI WH201 - Water Hammer Arrester Standard.

H. Underwriters Laboratories Inc.:

1. UL 393 - Indicating Pressure Gauges for Fire-Protection Service.

2. UL 404 - Gauges, Indicating Pressure, for Compressed Gas Service.

1.03 SUBMITTALS

A. Product Data:

1. Piping: Submit data on pipe materials, fittings, and accessories. Submit manufacturer's catalog information.

2. Valves: Submit manufacturers catalog information with valve data and ratings for each service.

3. Hangers and Supports: Submit manufacturers catalog information including load capacity.

4. Domestic Water Specialties: Submit manufacturers catalog information, component sizes, rough-in requirements, service sizes, and finishes.

5. Pumps: Submit pump type, capacity, certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Include electrical characteristics and connection requirements.

B. Manufacturer's Installation Instructions: Submit installation instructions for pumps, valves and accessories.

C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.04 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of valves and equipment.

B. Operation and Maintenance Data: Submit spare parts list, exploded assembly views and recommended maintenance intervals.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Accept valves and equipment on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Do not install underground piping when bedding is wet or frozen.

1.07 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.08 WARRANTY

A. Furnish one year manufacturer warranty for domestic water piping.

PART 2 – PRODUCTS

2.01 DOMESTIC WATER PIPING, ABOVE GRADE

A. Copper Tubing: ASTM B88, Type L, hard drawn.

1. Manufacturers:

a. Weiland

b. Meuller

2. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.

3. Joints: Solder, lead free, ASTM B32, 95-5 tin-antimony, or tin and silver, with melting range 430 to 535 degrees F.

2.02 UNIONS AND FLANGES

A. Manufacturers:

1. Nibco

B. Unions for Pipe 2 inches and Smaller:

1. Copper Piping: Class 150, bronze unions with soldered joints.

2. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier. Watts LF3001A.

C. Flanges for Pipe 2-1/2 inches and Larger:

1. Copper Piping: Class 150, slip-on bronze flanges. Elkhart 741

2.03 GATE VALVES

A. 2 inches and Smaller: MSS SP 80, Class 125 bronze body, bronze trim, threaded bonnet, stem, hand-wheel, inside screw, solid wedge disc, solder or threaded ends.

B. 2-1/2 inches and Larger: MSS SP 70, cast iron body, bronze trim, bolted bonnet, non-rising stem, hand-wheel, outside screw and yoke, solid wedge disc with bronze seat rings, flanged ends. Furnish chain-wheel operators for valves 6 inches and larger mounted over 8 feet above floor.

2.04 GLOBE VALVES

A. 2 inches and Smaller: MSS SP 80, Class 125, bronze body, bronze trim, threaded bonnet, hand wheel, Buna-N composition disc, solder or threaded ends.

B. 2-1/2 inches and Larger: MSS SP 85, Class 125, cast iron body, bronze trim, hand wheel, outside screw and yoke, flanged ends. Furnish chain-wheel operators for valves 6 inches and larger mounted over 8 feet above floor.

2.05 BALL VALVES

A. Manufacturers:

1. Milwaukee

2. Apollo

3. Nibco

B. 2 inches and Smaller: MSS SP 110, 600 CWP, two piece lead free brass body, chrome plated brass ball, full port, RPTFE seats and packing, lead free brass stem, solder or threaded ends, plated steel handle wit polyvinyl insulation.

2.06 CHECK VALVES

A. Manufacturers:

1. Milwaukee

2. Nibco

B. Horizontal Swing Check Valves:

1. 2 inches and Smaller: MSS SP-139, silicon bronze body and cap, bronze seat, PTFE disc,316 SS hinge pin, solder, or threaded ends.

2. 2-1/2 inches and Larger: MSS SP 71, cast iron body, bolted cap, bronze or cast iron disc, renewable disc seal and seat, flanged ends.

C. Bronze Ring Check Valves

1. ½” to 2”, Silicon Performance Bronze Alloy, Inline Lift Type, Spring Actuated Resilient Discs, conforms to MSS SP-139 and NSF/ANSI-61-8.

D. Spring Loaded Check Valves:

1. 2 inches and Smaller: MSS SP 80, bronze body, in-line spring lift check, silent closing, Buna-N disc, integral seat, solder or threaded ends.

2. 2-1/2 inches and Larger: MSS SP 71, wafer style, cast iron body, bronze seat, center guided bronze disc, stainless steel spring and screws, flanged ends.

2.07 PIPE HANGERS AND SUPPORTS

A. Manufacturers:

1. B-Line

2. Anvil

B. Plumbing Piping: Conform to ASME B31.9, ASTM F708, MSS SP 58, MSS SP 69, MSS SP 89.

C. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron, adjustable swivel, split ring.

D. Hangers for Cold Pipe Sizes 2 inches and Larger: Carbon steel, adjustable, clevis.

E. Hangers for Hot Pipe, Sizes 2 to 4 inches: Carbon steel, adjustable, clevis.

F. Hangers for Hot Pipe, Sizes 6 inches and Larger: Adjustable steel yoke, cast iron pipe roll and double hanger.

G. Multiple or Trapeze Hangers: Steel channels with welded supports or spacers and hanger rods.

H. Multiple or Trapeze Hangers for Hot Pipe Sizes 6 inches and Larger: Steel channels with welded supports or spacers and hanger rods, cast iron roll.

I. Wall Support for Pipe Sizes 3 inches and Smaller: Cast iron hooks.

J. Wall Support for Pipe Sizes 4 inches and Larger: Welded steel bracket and wrought steel clamps.

K. Wall Support for Hot Pipe Sizes 6 inches and Larger: Welded steel bracket and wrought steel clamp with adjustable steel yoke and cast iron pipe roll.

L. Vertical Support: Steel riser clamp.

M. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

N. Floor Support for Hot Pipe Sizes 4 inches and Smaller: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

O. Copper Pipe Support: Carbon steel ring, adjustable, copper plate.

2.08 STRAINERS

A. Manufacturers:

1. Watts

B. 4 inch and Smaller: Threaded brass body for 175 psi, Y pattern with 1/32-inch stainless steel perforated screen. Watts LF777.

C. 2 inch to 12 inch: Class 125, flanged iron body, Y pattern with stainless steel perforated screen. Watts 77F-DI-FDA-125.

2.09 WATER HAMMER ARRESTORS

A. Manufacturers:

1. Precision Plumbing Products SC Series

B. ASSE 1010; copper construction, piston type sized in accordance with PDI WH-201.

C. Pre-charged suitable for operation in temperature range -40 to 212 degrees F and maximum 200 psi working pressure.

2.10 TRAP PRIMERS

A. Manufacturers:

1. PPP Mini Prime

B. Multiple traps: Precision Plumbing Products Mini-Prime MPB500-115V.

C. Individual traps: Precision Plumbing Products Prime-Rite.

2.11 LAVATORY THERMOSTATIC MIXING VALVES

A. Manufacturers:

1. Chicago 131-ABNF

B. Valve: Cast brass body, Standard 3/8" compression Inlets and outlet, integral inlet check valves, adjustment cap with locking feature, corrosion resistant internal components, thermostatic Wax element design, thermostat controls both hot and cold water, minimum Flow Rate: 0.5 gpm, maximum Flow Rate: 6.4 gpm. Temperature out: 80°F to 120°F.

PART 3– EXECUTION

3.01 EXAMINATION

A. Verify excavations are to required grade, dry, and not over-excavated.

3.02 PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Remove scale and dirt, on inside and outside, before assembly.

3.03 INSTALLATION - HANGERS AND SUPPORTS

A. Inserts:

1. Provide inserts for placement in concrete forms.

2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.

3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe 4 inches and larger.

4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut flush with top of slab.

B. Pipe Hangers and Supports:

1. Install in accordance with ASME B31.9, ASTM F708, and MSS SP 89.

2. Support horizontal piping as schedule.

3. Install hangers to provide minimum 1/2-inch space between finished covering and adjacent work.

4. Place hangers within 12 inches of each horizontal elbow.

5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.

6. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.

7. Where piping is installed in parallel and at same elevation, provide multiple pipe or trapeze hangers.

8. Provide copper plated hangers and supports for copper piping.

9. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

10. Provide hangers adjacent to motor driven equipment with vibration isolation.

3.04 INSTALLATION - ABOVE GROUND PIPING

A. Install non-conducting dielectric connections wherever jointing dissimilar metals.

B. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

C. Install piping to maintain headroom without interfering with use of space or taking more space than necessary.

D. Group piping whenever practical at common elevations.

E. Slope piping and arrange systems to drain at low points.

F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

G. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

H. Provide access where valves and fittings are not accessible.

I. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

J. Provide support for utility meters in accordance with requirements of utility companies.

K. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting.

L. Install domestic water piping in accordance with ASME B31.9.

M. Sleeve pipes passing through partitions, walls and floors.

N. Install firestopping at fire rated construction perimeters and openings containing penetrating sleeves and piping.

O. Install unions downstream of valves and at equipment or apparatus connections.

P. Install valves with stems upright or horizontal, not inverted.

Q. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

R. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

S. Install ball valves for throttling, bypass, or manual flow control services.

T. Provide lug end butterfly valves adjacent to equipment when functioning to isolate equipment.

U. Provide spring loaded check valves on discharge of water pumps.

V. Provide flow controls in water circulating systems.

W. Install potable water protection devices on plumbing lines where contamination of domestic water may occur; on boiler feed water lines, janitor rooms, fire sprinkler systems, premise isolation, irrigation systems, flush valves, interior and exterior hose bibs.

X. Pipe relief from valves, back-flow preventers and drains to nearest floor drain.

Y. Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to plumbing fixtures equipped with flush valves and washing machine outlets.

3.05 INSTALLATION - SERVICE CONNECTIONS

A. Provide new water service complete with approved reduced pressure back-flow preventer with by-pass valves pressure reducing valve, and strainer.

B. Provide sleeve in wall for service main and support at wall with reinforced-concrete bridge. Caulk enlarged sleeve and make watertight with pliable material. Anchor service main inside to concrete wall.

3.06 FIELD QUALITY CONTROL

A. Test domestic water piping system in accordance with local authority having jurisdiction.

3.07 CLEANING

A. Prior to starting work, verify system is complete, flushed and clean.

3.08 SCHEDULES

A. Pipe Hanger Spacing:

PIPE MATERIAL	MAXIMUM HANGER SPACING Feet	HANGER ROD DIAMETER Inches
Copper Tube, 1-1/4 inches and smaller	6	1/2
Copper Tube, 1-1/2 inches and larger	10	1/2

END OF SECTION 22 11 00

SECTION 22 13 00
FACILITY SANITARY SEWERAGE

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Sanitary sewer piping buried.
2. Sanitary sewer piping above grade.
3. Pipe hangers and supports.
4. Cleanouts.

B. Related Sections:

1. Section 22 05 53 - Identification for Plumbing Piping and Equipment: Product requirements for pipe identification for placement by this section.
2. Section 22 07 00 - Plumbing Insulation: Product and execution requirements for pipe insulation.

1.02 REFERENCES

A. American Society of Mechanical Engineers:

1. ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings.
2. ASME B16.3 - Malleable Iron Threaded Fittings.
3. ASME B16.4 - Gray Iron Threaded Fittings.
4. ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings (DWV).
5. ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV.
6. ASME B31.9 - Building Services Piping.

B. ASTM International:

1. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings.
2. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
3. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings.
4. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.

C. Cast Iron Soil Pipe Institute:

1. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.

2. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.

D. Manufacturers Standardization Society of the Valve and Fittings Industry:

1. MSS SP 58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.

2. MSS SP 69 - Pipe Hangers and Supports - Selection and Application.

3. MSS SP 89 - Pipe Hangers and Supports - Fabrication and Installation Practices.

4. MSS SP 110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

E. Plumbing and Drainage Institute:

1. PDI G101 - Standard - Testing and Rating Procedure for Grease Interceptors.

1.03 SUBMITTALS

A. Product Data:

1. Piping: Submit data on pipe materials, fittings, and accessories. Submit manufacturers catalog information.

2. Hangers and Supports: Submit manufacturers catalog information including load capacity.

3. Sanitary Drainage Specialties: Submit manufacturers catalog information, component sizes, rough-in requirements, service sizes, and finishes.

B. Manufacturer's Installation Instructions: Submit installation instructions for material and equipment.

C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.04 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of equipment and clean-outs.

B. Operation and Maintenance Data: Submit frequency of treatment required for interceptors. Include, spare parts lists, exploded assembly views for pumps and equipment.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Do not install underground piping when bedding is wet or frozen.

1.07 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 – PRODUCTS

2.01 SANITARY SEWER PIPING, BURIED

A. Cast Iron Pipe: CISPI 301, hub-less.

1. Fittings: Cast iron, CISPI 301.

2. Joints: CISPI 310, neoprene gasket and stainless steel clamp-and-shield assemblies.

2.02 SANITARY SEWER PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, hub-less, service weight.

1. Fittings: Cast iron, CISPI 301.

2. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.

2.03 PIPE HANGERS AND SUPPORTS

A. Manufacturers:

1. Tolco.

2. Anvil.

B. Drain, Waste, and Vent: Conform to ASME B31.9, ASTM F708, MSS SP 58, MSS SP 69, MSS SP 89.

C. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Carbon steel, adjustable swivel, split ring.

D. Hangers for Pipe Sizes 2 inches and Larger: Carbon steel, adjustable, clevis.

E. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.

F. Wall Support for Pipe Sizes 3 inches and Smaller: Cast iron hooks.

G. Wall Support for Pipe Sizes 3 inches and Larger: Welded steel bracket and wrought steel clamp.

H. Vertical Support: Steel riser clamp.

I. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

J. Copper Pipe Support: Carbon-steel, copper-plated adjustable ring.

2.04 CLEANOUTS

A. Manufacturers:

1. Josam

2. Watts

B. Exterior Surfaced Areas: Round cast nickel bronze access frame and non-skid cover.

C. Interior Finished Floor Areas: Epoxy coated cast iron body with anchor flange, reversible clamping collar, threaded nickel bronze top assembly, and round scored cover with gasket in service areas and round depressed cover with gasket to accept floor finish in finished floor areas. Watts CO-200-R.

D. Interior Finished Wall Areas: Line type with lacquered cast iron body and round epoxy coated cover with gasket, and round stainless steel access cover secured with machine screw.

PART 3– EXECUTION

3.01 EXAMINATION

A. Verify excavations are to required grade, dry, and not over-excavated.

3.02 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

3.03 INSTALLATION - HANGERS AND SUPPORTS

A. Inserts:

1. Provide inserts for placement in concrete forms.

2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.

3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe 4 inches and larger.

4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.

B. Pipe Hangers and Supports:

1. Install in accordance with ASME B31.9, ASTM F708, and MSS SP 89.

2. Support horizontal piping as scheduled.

3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.

4. Place hangers within 12 inches of each horizontal elbow.

5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.

6. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.

7. Where installing several pipes in parallel and at same elevation, provide multiple pipe hangers or trapeze hangers.

8. Provide copper plated hangers and supports for copper piping.

9. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

10. Install hangers adjacent to motor driven equipment with vibration isolation.

3.04 INSTALLATION - BURIED PIPING SYSTEMS

A. Verify connection to existing piping system size, location, and invert are as indicated on Drawings.

B. Establish elevations of buried piping with not less than 2 ft of cover.

C. Establish minimum separation of 2 ft from other services piping in accordance with code.

D. Remove scale and dirt on inside of piping before assembly.

E. Install pipe to elevation as indicated on Drawings.

F. Place bedding material at trench bottom to provide uniform bedding for piping, level bedding materials in one continuous layer not exceeding 4 inches compacted depth; compact to 95 percent maximum density.

G. Install pipe on prepared bedding.

H. Route pipe in straight line.

I. Install plastic ribbon tape continuous over top of pipe.

J. Pipe Cover and Backfilling:

1. Maintain optimum moisture content of fill material to attain required compaction density.

2. After hydrostatic test, evenly backfill entire trench width by hand placing backfill material and hand tamping in 6 inches compacted layers to 12 inches minimum cover over top of jacket. Compact to 95 percent maximum density.

3. Evenly and continuously backfill remaining trench depth in uniform layers with backfill material.

4. Do not use wheeled or tracked vehicles for tamping.

3.05 INSTALLATION - ABOVE GROUND PIPING

A. Establish invert elevations, slopes for drainage to 1/4 inch per foot minimum. Maintain gradients.

B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Provide clearances at cleanout for snaking drainage system.

C. Encase exterior cleanouts in concrete flush with grade.

D. Install floor cleanouts at elevation to accommodate finished floor.

E. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

F. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

G. Install piping to maintain headroom. Do not spread piping, conserve space.

H. Group piping whenever practical at common elevations.

I. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

J. Provide clearance in hangers and from structure and other equipment for installation of insulation.

K. Provide access where valves and fittings are not accessible.

L. Install piping penetrating roofed areas to maintain integrity of roof assembly.

M. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

N. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting.

O. Sleeve pipes passing through partitions, walls and floors.

P. Install firestopping at fire rated construction perimeters and openings containing penetrating sleeves and piping.

Q. Support cast iron drainage piping at every joint.

3.06 FIELD QUALITY CONTROL

A. Test sanitary waste and vent piping system in accordance with local authority having jurisdiction.

3.07 SCHEDULES

PIPE HANGER SPACING		
PIPE MATERIAL	MAXIMUM HANGER SPACING Feet	HANGER ROD DIAMETER Inches
Cast Iron (All Sizes)	5	5/8
Cast Iron (All Sizes) with 10 foot length of pipe	10	5/8

Note for Cast Iron Pipe: Provide close to joint on barrel. Also provide hanger at each change of direction and each branch connection.

END OF SECTION 22 13 00

SECTION 22 33 00
ELECTRIC DOMESTIC WATER HEATERS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Commercial electric water heaters.

B. Related Sections:

1. Section: 22 11 00 - Facility Water Distribution: Supply connections to domestic water heaters.

1.02 REFERENCES

A. American Society of Heating, Refrigerating and Air-Conditioning Engineers:

1. ASHRAE 90.1 - Energy Standard for Buildings Except Low-Rise Residential Buildings.

B. American Society of Mechanical Engineers:

1. ASME PTC 25 - Pressure Relief Devices.

2. ASME Section VIII - Boiler and Pressure Vessel Code - Pressure Vessels.

1.03 SUBMITTALS

A. Product Data: Submit dimensioned drawings of water heaters indicating components and connections to other equipment and piping. Submit electrical characteristics and connection locations.

1.04 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Submit replacement part numbers and availability.

1.05 QUALITY ASSURANCE

A. Conform to ASME Section VIII for construction of water heaters.

B. Water Heater Performance Requirements: Equipment efficiency not less than prescribed by ASHRAE 90.1.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Accept water heaters on site in original labeled cartons. Inspect for damage.

B. Protect tanks with temporary inlet and outlet caps. Maintain caps in place until installation.

1.07 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.08 WARRANTY

A. Furnish 6 year manufacturer warranty for leaks, 2 years for parts..

PART 2 – PRODUCTS

2.01 COMMERCIAL ELECTRIC WATER HEATERS

A. Manufacturers:

1. EEMAX

2. Approved substitution

B. Type: Factory-assembled and wired, electric with storage.

C. Capacity: As scheduled on drawings.

D. Cover material: Plastic/stainless.

E. Element: Copper immersion.

F. Water connections: ½".

G. Adjustable thermostat.

H. Dimensions: 15" H. x 9" wide x 9" deep.

I. Temperature and pressure relief valve.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Maintain manufacturer's recommended clearances around and over water heaters.

B. Connect domestic hot water and domestic cold water piping to supply and return water heater connections.

C. Install discharge piping from relief valves and drain valves to building exterior.

D. Install water heater trim and accessories furnished loose for field mounting.

E. Install electrical devices furnished loose for field mounting.

END OF SECTION 22 33 00

SECTION 22 40 00
PLUMBING FIXTURES

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Flush valve water closets - wall hung.
2. Lavatories.
3. Floor drains.
4. Sinks.
5. Wall hydrants.

B. Related Sections:

1. Section 22 11 00 - Facility Water Distribution: Supply connections to plumbing fixtures.
2. Section 22 13 00 - Facility Sanitary Sewerage: Waste connections to plumbing fixtures.

1.02 REFERENCES

A. American National Standards Institute:

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ANSI Z124.2 - Plastic Shower Units.
3. ANSI Z358.1 - Emergency Eyewash and Shower Equipment.

B. Air-Conditioning and Refrigeration Institute:

1. ARI 1010 - Self-Contained, Mechanically Refrigerated Drinking-Water Coolers.

C. American Society of Mechanical Engineers:

1. ASME A112.6.1 - Floor-Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use.
2. ASME A112.18.1 - Plumbing Fixture Fittings.
3. ASME A112.19.1M - Enameled Cast Iron Plumbing Fixtures.
4. ASME A112.19.2M - Vitreous China Plumbing Fixtures.
5. ASME A112.19.3 - Stainless Steel Plumbing Fixtures (Designed for Residential Use).
6. ASME A112.19.4 - Porcelain Enameled Formed Steel Plumbing Fixtures.
7. ASME A112.19.5 - Trim for Water-Closet Bowls, Tanks and Urinals.

1.03 SUBMITTALS

A. Product Data: Submit catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.

B. Manufacturer's Installation Instructions: Submit installation methods and procedures.

C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.04 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Submit fixture, trim, exploded view and replacement parts lists.

1.05 QUALITY ASSURANCE

A. Provide products requiring electrical connections listed and classified by Underwriters Laboratories Inc., as suitable for purpose specified and indicated.

B. Maintain one copy of each document on site.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Accept fixtures on site in factory packaging. Inspect for damage.

B. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

1.07 WARRANTY

A. Furnish one year manufacturer warranty for plumbing fixtures.

PART 2 – PRODUCTS

2.01 WATER CLOSETS – FLOOR MOUNT, ADA

A. Water Closet (WC-1):

1. Manufacturer:

a. American standard

b. Kohler

2. American Standard “Cadet Right Height” elongated pressure assisted, 1.6 GPF toilet. Floor mounted, vitreous china, 16-1/2” bowl height, close-coupled flushometer tank,

3. Seat: Bemis 1955SSCT

4. Stop Valve: McGuire LFBV2-09 quarter turn brass ball valve.

5. Supplies: Fluidmaster PRO1T12

2.02 WATER CLOSETS – FLOOR MOUNT

A. Water Closet (WC-2):

1. Manufacturer:

a. American Standard

b. Kohler

2. American Standard “Baby Devoro Flowise” elongated toilet. Floor mounted, vitreous china, 1.28 gpf, 10-1/4" rim height, elongated siphon action bowl, chrome trip lever, sanitary dam on bowl. Tank complete with coupling components and tank trim. Color: white.

3. Stop Valve: McGuire LFBV2-09 quarter turn brass ball valve.

4. Supplies: Fluidmaster PRO1T12

5. Seat: American Standard 5001G.55

2.03 LAVATORIES

A. Lavatory (L-1), Wall Mount

1. Kohler #K-2032, “Greenwich” wall mount bathroom sink, 20-3/4” x 18.25”, vitreous china, 4” center faucet holes, oval basin, overflow drain.

2. Brass angle supply valves with stops.

3. Kohler K-8998 brass 1-1/2" P-trap.

4. Chicago 802-VE2805-665ABCP faucet with 0.5 gpm vandal proof non-aerating spray.

5. Thermostatic tempering valve for individual and multiple lavatory installations. Watts HydroGuard LFLM495. Lead free brass body and corrosion-resistant internal components.

6. Carrier: J. R. Smith figure 0710

2.04 FLOOR DRAIN (FD-1)

A. Floor Drains for Finished Spaces: Cast iron body, nickel bronze adjustable strainer, round top, Zurn ZN-415-B.

2.05 SINK (S-1)

A. Manufacturers:

1. Elkay

2. Just

B. Elkay Model LRAD 191865, 19” x 18” x 6-1/2” deep, stainless steel, ADA drop-in sink. Type 304 Stainless Steel with satin finish. Rear-center drain placement. (3) 1-½” diameter faucet holes on 4” centers.

C. Elkay Model LK99 3-1/2" Drain Type 304 Stainless Steel Body Strainer Basket Rubber Seal and Tailpiece.

D. Chicago Faucet Model W8D-GN2AE1-317ABCP 5-1/4” gooseneck faucet with wrist blade handles, 8” fixt centers, Chrome plated with secured blue and red index buttons,

E. McGuire 8912C chrome plated brass P-trap.

F. McGuire LF2165LK ½” supplies with wheel handle.

2.06 WALL HYDRANTS (WH-1)

A. Manufacturers:

1. Woodford Model B65

2. JR Smith Model 5509QT

3. Zurn Model 1320C

B. Non-Freeze type, complete with chrome finish wall box and hydrant, 3/4" inlet, 3/4" hose end outlet, loose key handle with backflow preventer.

2.07 TRAP PRIMER

A. Prime Rite Model PR-500.

2.08 WATER COOLER – ADA (EWC-1)

A. Manufacturers:

1. Elkay Model LZS8L

2. Haws

B. Wall Mounted ADA Cooler, filtered, refrigerated, light gray granite. Chilling capacity of 8.0 GPH (gallons per hour) of 50 deg. F drinking water, based on 80 deg. F inlet water and 90 deg. F ambient, per ASHRAE 18 testing. Features shall include filter. Furnished with Flexi-Guard ® safety bubbler. Electronic front and side bubbler pushbar activation. Product shall be Wall mount (On Wall), for Indoor applications, serving 1 station. Unit shall be certified to UL 399 and CAN/CSA C22.2 No. 120.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verify walls and floor finishes are prepared and ready for installation of fixtures.

B. Verify electric power is available and of correct characteristics.

C. Confirm millwork is constructed with adequate provision for installation of countertop lavatories and sinks.

3.02 PREPARATION

A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.03 INSTALLATION

A. Install each fixture with trap, easily removable for servicing and cleaning.

B. Provide trap primers at all floor drains, trench drains and floor sinks.

C. Provide chrome plated rigid or flexible supplies to fixtures with loose key stops, reducers, and escutcheons.

D. Install components level and plumb.

E. Install and secure fixtures in place with wall supports and bolts.

F. Seal fixtures to wall and floor surfaces with sealant.

G. Solidly attach water closets to floor with lag screws. Lead flashing is not intended hold fixture in place.

H. For ADA accessible water closets, install trip lever with handle to wide side of stall.

3.04 INTERFACE WITH OTHER PRODUCTS

A. Review millwork shop-drawings. Confirm location and size of fixtures and openings before rough in and installation.

3.05 ADJUSTING

A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.06 CLEANING

A. Clean plumbing fixtures and equipment.

3.07 PROTECTION OF INSTALLED CONSTRUCTION

A. Do not permit use of fixtures before final acceptance.

END OF SECTION 22 40 00

SECTION 23 00 00
GENERAL MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS

A. AIA Document A201 "General Conditions of the Contract for Construction" with supplements thereto, special conditions and applicable portions of Division 1 are hereby made a part of this division of the specifications and shall apply to work under this Division of the specifications.

1.02 WORK INCLUDED

A. The work of Divisions 23 consists of providing labor and products, and of performing all operations required for the complete operating installation of all mechanical systems as shown and specified, in strict accordance with this and all sections of these specifications, applicable drawings, terms, and conditions of the contract, and all applicable codes and ordinances governing installation of the various mechanical systems. Coordinate all work fully with the work of other crafts. Provide all systems complete and in proper operating order.

1.03 INTENT OF DRAWINGS

A. Drawings and specifications are complementary, each to the other; what is shown on one is as binding as if called for in both.

B. The drawings are partly diagrammatic and do not show all offsets in ducts or piping or exact location of piping, ducts, etc. Also, the drawings do not necessarily show in detail all features of the installation. It is the responsibility of the Contractor to provide equipment that fits into the space allotted and allows adequate acceptance clearances for installation, replacement, entry, servicing and maintenance.

C. Refer to details, diagrams and schematics, in addition to all Mechanical Specifications, for detailed requirements for isolating valves, drain valves, vents, instruments, flexible connectors and similar components.

D. If there appears to be insufficient space to install the mechanical work as shown, the A/E shall be notified prior to proceeding with the work. Failure to comply with this requirement will be considered sufficient cause to require altering the work, at no additional cost to the contract, as directed by the A/E.

1.04 CODES, PERMITS, STANDARDS, INSPECTIONS AND FEES

A. All materials furnished and all work installed shall comply with the current versions of the National Fire Codes of the National Fire Protection Association, International Building Code, International Mechanical Code, Uniform Plumbing Code, Washington State Energy Code, Federal, State and Local standards, with the requirements of local utility companies, and with the requirements of all governmental agencies and departments having jurisdiction.

B. All materials and equipment for the electrical portion of the mechanical systems shall bear the approval label, or shall be listed by the Underwriters' Laboratories, Inc.

C. The Contractor shall give all necessary notices, obtain all permits and pay all government sales taxes, fees and other costs, including utility connections or extensions, in connection with his work; file all necessary plans, arrange for all necessary inspections, prepare all documents and obtain all necessary approvals of all governmental departments having jurisdiction; obtain all required certificates of inspection for his work, and deliver three copies of same before request for acceptance and final payment for work.

D. The Contractor shall include in the work, without extra cost, any labor, materials, services, apparatus, drawings, in order to comply with all applicable laws, ordinances, rules and regulations.

E. Nothing in the Drawings or Specifications shall be construed as directing or permitting work which is not fully in conformance with Codes and Regulations.

F. Where the Drawings or Specifications indicate materials or construction which exceeds the quality or size required by Codes and Regulations, the provisions of the Drawings or Specifications take precedence over the requirements of the Codes and Regulations.

G. Any variance from code requirements shall be promptly reported to the A/E. No work shall be installed which is not in accordance with Codes and Regulations.

1.05 REVIEW OF MATERIAL AND EQUIPMENT SUBMITTALS

A. General: Procedures and requirements for submittals are addressed in Division 1. In addition, comply with specific requirements of the individual sections and as noted herein.

B. Submittals: Provide submittals for all products and systems described in Divisions 21, 22 and 23 and shown on the Drawings to demonstrate compliance with the requirements of the project. Furnish equipment submittals in the manner described elsewhere in these Specifications. In addition, include data for review, organized as noted below. No work shall begin or products ordered until submittals are approved.

C. Data Required for Review: Mark submittal literature clearly, bind 8-1/2 x 11 literature in three-hole, hard-backed, loose-leaf binders by individual sets, and include all equipment and material shown on drawings and specified. Submittals not organized and prepared as follows will be returned to the Contractor for compliance prior to any detailed review. Indicate the following:

1. Table of Contents listed by specification index sections.

2. Individual tabs numbered by specification section.

3. Specification reference and/or drawing reference for which literature is submitted.

4. Manufacturer's name and address, and supplier's name, address and telephone number.

5. Catalog designation or model number.

6. Rough-in data and dimensions.

7. Performance curves and rated capacities.

8. Operation characteristics.

9. Catalogs, pamphlets, or other documents submitted to describe items on which approval is being requested shall be specific, and identification in catalog, pamphlet, etc., of item submitted shall be clearly made. Data of a general nature will not be accepted. When equipment submitted is of a different size or weight, or has different access, service or installation clearances, than the designed equipment, the equipment submittals shall clearly note the differences.

10. Working construction drawings (shop drawings).

D. Partial Submittals: If other than a complete submittal is made, the Contractor may make partial submittals separated into complete specification section classifications. Piece-meal submittals will be returned without review, except for special situations.

E. Submittal review is for general design and arrangement only, and does not relieve the Contractor from any of the requirements of the Contract Documents. Submittals will not be checked for quantity, dimension, fit, or proper technical design of manufactured equipment. Where deviations of substitute product or system performance have not been specifically noted in the submittal by the Contractor, provision of a complete and satisfactory working installation is the sole responsibility of the Contractor.

F. Equipment Deviations:

1. Items of equipment or material designated in the plans or specifications by use of a specific manufacture and number are so noted to indicate a standard of design and not necessarily to be restrictive. Substituted equipment or materials shall be equivalent in capacities, weight, acoustical performance and electrical requirements to the equipment used as the basis for the design. Note that a manufacturer's product may be listed as an approved substitute but may still have different electrical requirements from the product listed as the basis for the design.

2. Where the Contractor proposes to use an item of equipment other than that specified or detailed on the drawing which requires any redesign of the structure, partitions, foundations, piping, wiring or any other part of the mechanical, electrical or architectural layout, all such redesign, all new drawings and detailing required therefore, and all additional construction costs, shall be prepared by the Contractor at his own expense and approved by the A/E.

3. Where such approved deviation requires a different quantity and arrangement of ductwork, piping, wiring, conduit, and equipment from that specified or indicated on the drawings, the Contractor shall furnish and install any such ductwork, piping, structural supports, insulation, controllers, motors, starters, electrical wiring and conduit, and any other additional equipment required by the system, at no additional cost to the Contract. The submittals shall clearly indicate any difference in requirements of other trades from the product listed as the basis for the design.

4. If the dimensions or access requirements for equipment submitted differ from equipment dimensions or access requirements indicated on the drawings the submittals shall be clearly marked to indicate the differences. The Contractor shall be responsible for selecting equipment which fits the available space as well as being equivalent to the specified equipment.

5. All materials shall be furnished and installed in conformance with Codes and Regulations.

6. All equipment of the same type, such as valves, fittings, fixtures, fans, control components, etc., shall be products of the same manufacturer, used as recommended by the manufacturer.

1.06 SCHEDULE OF VALUES

A. The schedule of Values for Mechanical work shall be prepared in accordance with Division 1 requirements. The breakdown of Mechanical work shall include the following categories:

1. Mobilization and Demobilization

2. HVAC Equipment

3. Ductwork and Accessories

4. TAB

1.07 ABBREVIATIONS/DEFINITIONS

A/E	Architect/Engineer
AGA	American Gas Association
AISC	American Institute of Steel Construction
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute
ARI	Air-Conditioning and Refrigeration Institute
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
CAGI	Compressed Air and Gas Institute
CISPI	Cast Iron Soil Pipe Institute
F	degrees, Fahrenheit
FRP	Fiberglass Reinforced Plastic
FM	Factory Mutual Engineering Corporation
ICBO	International Conference of Building Officials
MSS	Manufacturer's Standardization Society
NEMA	National Electrical Manufacturer's Association
NEC	National Electrical Code
NFPA	National Fire Protection
psig	pounds per square inch gage pressure
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
UL	Underwriters Laboratories, Inc.
v	Volts
wp	Working Pressure (psig)
wg	Water gage

1.08 SPECIFICATION TERMINOLOGY

A. Streamlining: In many instances, the products, reference standards, and other itemized specifications have been listed without verbiage. In these cases, it is implied that the Contractor shall provide the products and perform in accordance with the references listed.

B. "Provide", as used in this division of the specifications, means furnish all material, labor, sub-contracts, and appurtenances required, including mark-up, and install to a complete, operating, finished condition.

C. "Install", as used in this division of the specifications, means to set in place and connect, ready for use and in complete, operating, finished condition, material that has been furnished by other than the Mechanical Contractor.

D. "Rough-in and Connect Only" means provide an appropriate system connection such as supplies with stops, continuous wastes with traps, shut-off valves required, and all piping connections, testing, etc., for proper operation, and to connect equipment furnished by other than the Mechanical Contractor. Equipment furnished is received, uncrated, assembled and set in place by supporting crafts unless they make prior arrangements to hire the mechanical installer for this work.

E. "Accessible" means arranged so that an average size man may complete any service required without disassembly or damage to the surrounding installation.

F. "Serviceable" means arranged so that the component or product in question may be properly serviced without disassembly, destruction, or damage to the surrounding installation or item being serviced.

G. "Product" is a generic term which includes materials, equipment, fixtures and any physical item used on the project.

1.09 DEMOLITION

A. Demolition of existing mechanical work is noted on the Drawings. the exact extent of demolition required must be verified by on-site review. The scope of demolition required is as follows:

B. Disconnect and demolished the existing HVAC ductwork and supports as shown on the drawings.

C. Remove and replace or reinstall all equipment, piping, ductwork and accessories which must be moved or disassembled in order to accomplish the work shown.

D. Install new piping connections, fittings, insulation, and hangers, as necessary on any piping which is to remain in service, to provide a complete and functional system.

E. Where there is any question as to whether materials are to be removed or are to remain, the Architect or Engineer shall be consulted.

F. Where mechanical materials are removed and the surrounding surfaces are to remain, the surfaces shall be repaired, rebuilt and patched, with the quality of work and materials to be in conformance with the requirements of other sections of the Specifications. Fire rated construction shall be patched to maintain the fire rating.

G. The Owner has the right to retain ownership of any materials being removed. Other materials shall be the property of the Contractor, and shall be promptly removed from the site.

H. Maximum precautions shall be taken to provide protection for the existing building and equipment from damage. Prevent water and dust from entering the existing building.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 COOPERATION WITH OTHER TRADES

A. This Contractor shall give full cooperation to other trades and shall furnish in writing to other contractors, with copies to the A/E, any information necessary to permit the work of all trades to be installed satisfactorily, with the least possible interference or delay, and with maximum headroom and clearance.

B. The Contractor shall furnish to other trades, as required, all necessary templates, patterns, setting plans, and shop details for the proper installation of work and for the purpose of coordinating adjacent work.

3.02 PROTECTION

A. The Contractor shall protect all work and material from damage by his work or workmen, and shall be liable for all damage thus caused.

B. The Contractor shall be responsible for work and equipment until finally inspected, tested, and accepted; he shall protect work against theft, injury or damage; and shall carefully store material and equipment received on site which are not immediately installed. He shall close open ends of work with temporary covers or plugs during storage and construction to prevent entry of obstructing material.

3.03 SCAFFOLDING, RIGGING, HOISTING

A. The Contractor shall furnish all scaffolding, rigging, hoisting, and services necessary for erection and delivery into the premises of any equipment and apparatus furnished. Remove same from premises when no longer required.

3.04 MATERIAL AND WORKMANSHIP

A. All materials and apparatus required for the work shall be new, of first-class quality, and shall be furnished, delivered, erected, connected and finished in every detail, and shall be so selected and arranged as to fit properly into the building spaces. Where no specific kind or quality of material is given, a first-class standard article as approved by the A/E shall be furnished.

B. The Contractor shall furnish the services of an experienced superintendent, who shall be constantly in charge of the installation of the work, together with all skilled workmen, fitters, metal workers, welders, helpers and labor required to unload, transfer, erect, connect-up, adjust, start, operate, and test each system.

C. Unless otherwise specifically indicated on the plans or specifications, all equipment and materials shall be installed with the approval of the A/E in accordance with the recommendations of the manufacturer. This includes the performance of such tests as the manufacturer recommends.

D. As required by requirements of the Mechanical Specifications, other portions of the Specifications, and Standards to which reference is made in the Specifications, or where

prohibited by Codes, Regulations and Ordinances, no materials shall be installed which exceed the allowable limits of flame-spread or smoke-developed indexes, or which do not meet the requirements for Approved Plastic Materials as defined in the Uniform Building Code. (No exposed PVC materials shall be installed in the building.)

3.05 INSTALLATION

A. Cutting and Patching: Keep cutting and patching to a minimum. If required, all patching shall conform to specifications for the new General Construction work. Finish to match existing work. Conform to Division 1.

B. Measurements: Verify space availability by field measurement prior to submitting shop drawings for approval.

C. Roughing-In Dimensions: Obtain roughing-in dimensions for equipment from approved shop drawings or actual equipment measurements.

D. Manufacturer's Installation Instructions: Follow manufacturer's written instructions where furnished. If the details are in conflict with design drawings, notify the A/E prior to proceeding with the installation.

E. Accessibility: Install all equipment which requires periodic servicing or repairs so it is readily accessible. Otherwise, obtain the A/E's approval of location.

F. Provision for Light Fixtures: In installing piping and ductwork, allow clearance for light fixtures. If interferences occur, move the piping or ducts and, if not possible, notify the A/E.

G. Delivery, Storage, and Handling.

1. Handle, store and protect equipment and materials to prevent damage before and during installation in accordance with the manufacturer's recommendations and as approved by the A/E. Replace damaged or defective items.

2. Factory finished equipment which is damaged shall be refinished as required to bring the equipment to a like-new condition in accordance with manufacturer's recommendations. If, in the opinion of the A/E, the equipment cannot be satisfactorily repaired, the equipment shall be replaced.

3.06 AS-BUILT DRAWINGS

A. Furnish one set of as-built drawings to the A/E in conformance with the requirements of Division 1.

B. As-built drawings shall show all buried piping and duct work, with dimensions given to permanent, easily identified building features.

C. As-built drawings shall indicate locations of all valves, dampers, and other access points which are above ceilings or concealed in walls. Valve numbers shall be indicated on the As-Built Drawings.

3.07 OPERATING AND MAINTENANCE INSTRUCTIONS AND MANUALS

A. Prepare three copies of an Operating and Maintenance Manual for all equipment provided under Division 23 in accordance with Division 01.

B. Contents:

1. Operating and Maintenance Manuals shall include operating information, maintenance information, control information, parts lists, filter information when applicable, lubrication information and exploded view diagrams when applicable.

2. Information shall be arranged in an orderly manner, generally in the sequence of the specifications.

3. An index shall list the contents of each section of the manual, with index tabs matching the index. The index page shall list the name, address, and telephone number of the mechanical contractor. The index page of each section shall list the name, address, and telephone number of the contractor or subcontractor responsible for the products included in that section of the manual.

4. The index page shall list the name, address, and telephone number of a 24-hour, seven-day emergency organization; either the contractor or a service organization authorized to represent the contractor.

5. The temperature control section shall include information for control components, control diagrams, sequences of operation, and As-Built drawings of the controls. When applicable, the control section shall include point-to-point test lists and other testing, adjusting and calibration documentation.

6. The manuals shall include Testing and Balancing Reports.

C. Manuals shall be provided in PDF format. The manual shall be printed or stamped with the name of the project, the names of the Owner, Consulting Engineer, and Contractor, and the year the project was completed.

D. Submit one preliminary PDF copy of the manual for review by the A/E prior to assembling the final copies. This preliminary copy will be returned, and with any required additions and corrections, can be used as one of the final copies of the manual.

E. Submit the final manuals before requesting final payment.

3.08 GUARANTEES AND WARRANTIES

A. Submit written copies of all guarantees and warranties prior to requesting final payment.

3.09 COMPLETION OF WORK

A. When requesting final inspection, give ten days' notice. Submit written certification that the work has been fully completed in strict accordance with plans and specifications.

3.10 INSPECTION

A. Submit written certification of inspection from the governing building authority stating that all work has been inspected, accepted and approved as complying with existing governing ordinances and codes.

END OF SECTION 23 00 00

SECTION 23 05 93
TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Testing, adjusting, and balancing of air systems.

B. Related Sections:

1. Section 23 09 23 - Direct-Digital Control System for HVAC: Requirements for coordination between DDC system and testing, adjusting, and balancing work.

2. Section 23 09 93 - Sequence of Operations for HVAC Controls: Sequences of operation for HVAC equipment.

1.02 REFERENCES

A. Associated Air Balance Council:

1. AABC MN-1 - National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems.

B. American Society of Heating, Refrigerating and Air-Conditioning Engineers:

1. ASHRAE 111 - Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning and Refrigeration Systems.

C. Natural Environmental Balancing Bureau:

1. NEBB - Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems.

1.03 SUBMITTALS

A. Prior to commencing Work, submit proof of latest calibration date of each instrument.

B. Test Reports: Indicate data on AABC MN-1 National Standards for Total System Balance forms

C. Field Reports: Indicate deficiencies preventing proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.

D. Submit draft copies of report for review prior to final acceptance of Project.

E. Furnish reports in PDF format, manuals, complete with table of contents page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.

1.04 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of balancing valves and rough setting.

B. Operation and Maintenance Data: Furnish final copy of testing, adjusting, and balancing report inclusion in operating and maintenance manuals.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with [AABC MN-1 National Standards for Field Measurement and Instrumentation, Total System Balance.

B. Maintain one copy of each document on site.

C. Prior to commencing Work, calibrate each instrument to be used.

1.06 QUALIFICATIONS

A. Agency: Company specializing in testing, adjusting, and balancing of systems specified in this section with minimum three years documented experience certified by AABC

1.07 SEQUENCING

A. Sequence balancing between completion of systems tested and Date of Substantial Completion.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify systems are complete and operable before commencing work. Verify the following:

1. Systems are started and operating in 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. Fans are rotating correctly.

7. Fire and volume dampers are in place and open.

8. Air coil fins are cleaned and combed.

9. Access doors are closed and duct end caps are in place.

10. Air outlets are installed and connected.

11. Duct system leakage is minimized.

3.02 PREPARATION

A. Furnish instruments required for testing, adjusting, and balancing operations.

B. Make instruments available to Architect/Engineer to facilitate spot checks during testing.

3.03 INSTALLATION TOLERANCES

A. Air Handling Systems: Adjust to within plus or minus 10 percent of design.

B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 10 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

3.04 ADJUSTING

A. Verify recorded data represents actual measured or observed conditions.

B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

C. After adjustment, take measurements to verify balance has not been disrupted. If disrupted, verify correcting adjustments have been made.

D. Report defects and deficiencies noted during performance of services, preventing system balance.

E. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

F. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by Owner.

G. Check and adjust systems approximately six months after final acceptance and submit report.

3.05 AIR SYSTEM PROCEDURE

A. Adjust air handling and distribution systems to obtain required or design supply, return, and exhaust air quantities at site altitude.

B. Make air quantity measurements in main ducts by Pitot tube traverse of entire cross sectional area of duct.

C. Measure air quantities at air inlets and outlets.

D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts.

E. Use volume control devices to regulate air quantities only to extent adjustments do not create objectionable air motion or sound levels. Effect volume control by using volume dampers located in ducts.

F. Vary total system air quantities by adjustment of fan speeds. Provide sheave drive changes to vary fan speed. Vary branch air quantities by damper regulation.

G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.

H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across fan. Make allowances for 50 percent loading of filters.

I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.

K. At modulating damper locations, take measurements and balance at extreme conditions. Balance variable volume systems at maximum airflow rate, full cooling, and at minimum airflow rate, full heating.

L. Measure building static pressure and adjust supply, return, and exhaust air systems to obtain required relationship between each to maintain approximately 0.05 inches positive static pressure near building entries.

M. For variable air volume system powered units set volume controller to airflow setting indicated. Confirm connections properly made and confirm proper operation for automatic variable-air-volume temperature control.

N. On fan powered VAV boxes, adjust airflow switches for proper operation.

3.06 SCHEDULES

A. Equipment Requiring Testing, Adjusting, and Balancing:

1. Packaged Roof Top Heating/Cooling Units.

2. Air Handling Units.

3. Fans.

4. Air Inlets and Outlets.

B. Report Forms

1. Title Page:

a. Name of Testing, Adjusting, and Balancing Agency

b. Address of Testing, Adjusting, and Balancing Agency

c. Telephone and facsimile numbers of Testing, Adjusting, and Balancing Agency

d. Project name

e. Project location

f. Project Architect

g. Project Engineer

h. Project Contractor

i. Project altitude

j. Report date

2. Summary Comments:

a. Design versus final performance

b. Notable characteristics of system

c. Description of systems operation sequence

d. Summary of outdoor and exhaust flows to indicate building pressurization

e. Nomenclature used throughout report

f. Test conditions

3. Instrument List:

a. Instrument

b. Manufacturer

c. Model number

d. Serial number

e. Range

f. Calibration date

4. Electric Motors:

a. Manufacturer

b. Model/Frame

c. HP/BHP and kW

d. Phase, voltage, amperage; nameplate, actual, no load

e. RPM

f. Service factor

g. Starter size, rating, heater elements

h. Sheave Make/Size/Bore

5. Exhaust Fan Data:

a. Location

b. Manufacturer

c. Model number

d. Serial number

e. Air flow, specified and actual

f. Total static pressure (total external), specified and actual

g. Inlet pressure

h. Discharge pressure

i. Sheave Make/Size/Bore

j. Number of Belts/Make/Size

k. Fan RPM

6. Duct Traverse:

a. System zone/branch

b. Duct size

c. Area

d. Design velocity

e. Design air flow

f. Test velocity

g. Test air flow

h. Duct static pressure

i. Air temperature

j. Air correction factor

k. Test static pressure

l. Test orifice differential pressure

m. Leakage

7. Air Monitoring Station Data:
    a. Identification/location
    b. System
    c. Size
    d. Area
    e. Design velocity
    f. Design air flow
    g. Test velocity
    h. Test air flow
8. Air Distribution Test Sheet:
    a. Air terminal number
    b. Room number/location
    c. Terminal type
    d. Terminal size
    e. Area factor
    f. Design velocity
    g. Design air flow
    h. Test (final) velocity
    i. Test (final) air flow
    j. Percent of design air flow

END OF SECTION 23 05 93

SECTION 23 07 00
HVAC INSULATION

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Piping system insulation.
2. Equipment insulation.
3. Pipe insulation jackets.
4. Equipment insulation jackets.
5. Insulation accessories including vapor retarders and accessories.
6. Ductwork insulation.
7. Ductwork insulation jackets.
8. Duct liner.

B. Related Sections:

1. Section 23 05 53 - Identification for HVAC Piping and Equipment: Product requirements for HVAC piping and equipment identification.

1.02 REFERENCES

A. ASTM International:

1. ASTM A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
2. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
3. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
4. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement.
5. ASTM C449/C449M - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement.
6. ASTM C518 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
7. ASTM C533 - Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation.
8. ASTM C534 - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.

9. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation.

10. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation.

11. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.

12. ASTM C591 - Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation.

13. ASTM C592 - Standard Specification for Mineral Fiber Blanket Insulation and Blanket-Type Pipe Insulation (Metal-Mesh Covered) (Industrial Type).

14. ASTM C610 - Standard Specification for Molded Expanded Perlite Block and Pipe Thermal Insulation.

15. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation.

16. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.

17. ASTM C921 - Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.

18. ASTM C1071 - Standard Specification for Thermal and Acoustical Insulation (Glass Fiber, Duct Lining Material).

19. ASTM C1126 - Standard Specification for Faced or Unfaced Rigid Cellular Phenolic Thermal Insulation.

20. ASTM C1136 - Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation.

21. ASTM C1290 - Standard Specification for Flexible Fibrous Glass Blanket Insulation Used to Externally Insulate HVAC Ducts.

22. ASTM D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

23. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

24. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.

25. ASTM E162 - Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source.

26. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

B. Sheet Metal and Air Conditioning Contractors':

1. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.

1.03 SUBMITTALS

A. Product Data: Submit product description, thermal characteristics and list of materials and thickness for each service, and location.

B. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.

B. Protect insulation from weather and construction traffic, dirt, water, chemical, and damage, by storing in original wrapping.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Install insulation only when ambient temperature and humidity conditions are within range recommended by manufacturer.

1.06 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.07 WARRANTY

A. Furnish one year manufacturer warranty for man made fiber.

PART 2 - PRODUCTS

2.01 MAN MADE MINERAL FIBER

A. Insulation: ASTM C547 Mineral Fiber Pipe Insulation, Type I, 850 degrees F.

B. Insulation: ASTM C795; semi-rigid, noncombustible, end grain adhered to jacket.

1. ‘K’ factor: ASTM C177, 0.24 at 75 degrees F.

2. Maximum service temperature: 650 degrees F.

3. Maximum moisture absorption: 0.2 percent by volume.

C. Vapor Retarder Jacket:

1. ASTM C921, White Kraft paper with glass fiber yarn, bonded to aluminized film.

2. Moisture vapor transmission: ASTM E96; 0.02 perm-inches.

D. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.

E. Vapor Retarder Lap Adhesive:

1. Compatible with insulation.

F. Insulating Cement/Mastic:

1. ASTM C195; hydraulic setting on mineral wool.

G. Glass Fiber Fabric:

1. Cloth: Untreated; 9 oz/sq yd weight.

2. Blanket: 1.0 lb/cu ft density.

H. Indoor Vapor Retarder Finish:

1. Cloth: Untreated; 9 oz/sq yd weight.

2. Vinyl emulsion type acrylic, compatible with insulation, black color.

I. Outdoor Vapor Retarder Mastic:

1. Product Description: Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.

J. Outdoor Breather Mastic:

1. Product Description: Vinyl emulsion type, black acrylic or mastic, compatible with insulation.

K. Insulating Cement:

1. ASTM C449/C449M.

2.02 MAN MADE MINERAL FIBER, FLEXIBLE BLANKET OR BATTS

A. Insulation: ASTM C1290; Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.

1. Operating Temperatures: 250 degrees F.

2. Density: 0.75 lb/cu ft.

3. ‘K’ factor: ASTM C518, 0.30 at 75 degrees F.

B. Vapor Retarder Jacket: ASTM 1136, Type II Flexible and Low Permeance Vapor Retarders for Thermal Insulation.

1. For systems operating at temperatures below ambient, close and secure seams and joints. When outward clinching staples are used, seal penetrations.

C. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.

D. Vapor Retarder Lap Adhesive:

1. Compatible with insulation.

E. Insulating Cement/Mastic:

1. ASTM C195; hydraulic setting on mineral wool.

2.03 MINERAL FIBER, FLEXIBLE

A. Insulation: ASTM C553 Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications, Type II.

B. Vapor Retarder Jacket:

1. Kraft paper with glass fiber yarn and bonded to aluminized film.

2. Moisture vapor transmission: ASTM E96; 0.02 perm.

3. Secure with pressure sensitive tape.

C. Vapor Retarder Tape:

1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.

D. Outdoor Vapor Retarder Mastic:

1. Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.

E. Tie Wire: Annealed steel, 16 gage.

2.04 MINERAL FIBER, RIGID

A. Insulation: ASTM C612 Mineral Fiber Block and Board Insulation, Type IA

B. Vapor Retarder Jacket:

1. Kraft paper with glass fiber yarn and bonded to aluminized film.

2. Moisture vapor transmission: ASTM E96; 0.04 perm.

3. Secure with pressure sensitive tape.

C. Vapor Retarder Tape:

1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.

D. Indoor Vapor Retarder Finish:

1. Cloth: Untreated; 9 oz/sq yd weight, glass fabric.

2. Vinyl emulsion type acrylic, compatible with insulation, black color.

2.05 GLASS FIBER DUCT LINER

A. Insulation: ASTM C1071 Thermal and Acoustical Insulation (Glass Fiber, Duct Lining Material), Type II.

B. Adhesive:

1. Waterproof, ASTM E162 fire-retardant type.

C. Liner Fasteners: Galvanized steel, impact applied with integral head.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify piping, equipment and ductwork has been tested before applying insulation materials.

B. Verify surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION

A. Exposed Piping: Locate insulation and cover seams in least visible locations.

B. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.

C. Man made mineral fiber insulated pipes conveying fluids below ambient temperature:

1. Furnish factory-applied or field-applied vapor retarder jackets. Secure factory-applied jackets with pressure sensitive adhesive self-sealing longitudinal laps and butt strips. Secure field-applied jackets with outward clinch expanding staples and seal staple penetrations with vapor retarder mastic.

2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor retarder adhesive or PVC fitting covers.

D. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.

E. Man made mineral fiber insulated pipes conveying fluids above ambient temperature:

1. Furnish factory-applied or field-applied standard jackets. Secure with outward clinch expanding staples or pressure sensitive adhesive system on standard factory-applied jacket and butt strips or both.

2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.

F. Inserts and Shields:

1. Application: Piping or Equipment 2 inches diameter or larger.

2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.

3. Insert location: Between support shield and piping and under finish jacket.

4. Insert configuration: Minimum 6 inches long, of thickness and contour matching adjoining insulation; may be factory fabricated.

5. Insert material: Compression resistant insulating material suitable for planned temperature range and service.

G. Continue insulation through penetrations of building assemblies or portions of assemblies having fire resistance rating of one hour or less. Provide intumescent firestopping when continuing insulation through assembly. Finish at supports, protrusions, and interruptions. Refer to Section 07 84 00 for penetrations of assemblies with fire resistance rating greater than one hour.

H. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces less than 10 feet above finished floor: Finish with PVC jacket and fitting covers.

I. Exterior Applications: Provide vapor retarder jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor retarder cement. Cover with aluminum jacket with seams located at 3 or 9 o'clock position on side of horizontal piping with overlap facing down to shed water or on bottom side of horizontal equipment.

J. Buried Piping: Insulate only where insulation manufacturer recommends insulation product may be installed in trench, tunnel or direct buried. Install factory fabricated assembly with inner all-purpose service jacket with self-sealing lap, and asphalt impregnated open mesh glass fabric, with 1 mil thick aluminum foil sandwiched between three layers of bituminous compound; outer surface faced with polyester film.

K. Heat Traced Piping: Insulate fittings, joints, and valves with insulation of like material, thickness, and finish as adjoining pipe. Size insulation large enough to enclose pipe and heat tracer. Cover with aluminum jacket with seams located at 3 or 9 o'clock position on side of horizontal piping with overlap facing down to shed water.

L. Factory Insulated Equipment: Do not insulate.

M. Exposed Equipment: Locate insulation and cover seams in least visible locations.

N. Apply insulation close to equipment by grooving, scoring, and beveling insulation. Fasten insulation to equipment with studs, pins, clips, adhesive, wires, or bands.

O. Fill joints, cracks, seams, and depressions with bedding compound to form smooth surface. On cold equipment, use vapor retarder cement.

P. Insulated equipment containing fluids below ambient temperature: Insulate entire system.

Q. Mineral fiber insulated equipment containing fluids below ambient temperature: Provide vapor retarder jackets, factory-applied or field-applied. Finish with glass-cloth and vapor barrier adhesive.

R. For hot equipment containing fluids over 140 degrees F, insulate flanges and unions with removable sections and jackets.

S. Mineral fiber insulated equipment containing fluids above ambient temperature: Provide standard jackets, with or without vapor retarder, factory-applied or field-applied. Finish with glass cloth and adhesive.

T. Finish insulation at supports, protrusions, and interruptions.

U. Equipment in Mechanical Equipment Rooms or Finished Spaces: Finish with PVC jacket and fitting covers.

V. Nameplates and ASME Stamps: Bevel and seal insulation around; do not insulate over.

W. Equipment Requiring Access for Maintenance, Repair, or Cleaning: Install insulation for easy removal and replacement without damage.

X. Insulated ductwork conveying air below ambient temperature:

1. Provide insulation with vapor retarder jackets.

2. Finish with tape and vapor retarder jacket.

3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.

4. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.

Y. Insulated ductwork conveying air above ambient temperature:

1. Provide with or without standard vapor retarder jacket.

2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.

Z. External Duct Insulation Application:

1. Secure insulation with vapor retarder with wires and seal jacket joints with vapor retarder adhesive or tape to match jacket.

2. Secure insulation without vapor retarder with staples, tape, or wires.

3. Install without sag on underside of ductwork. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift ductwork off trapeze hangers and insert spacers.

4. Seal vapor retarder penetrations by mechanical fasteners with vapor retarder adhesive.

5. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

AA. Duct and Plenum Liner Application:

1. Adhere insulation with adhesive for 100 percent coverage.

2. Secure insulation with mechanical liner fasteners. Comply with SMACNA Standards for spacing.

3. Seal and smooth joints. Seal and coat transverse joints.

4. Seal liner surface penetrations with adhesive.

5. Duct dimensions indicated are net inside dimensions required for airflow. Increase duct size to allow for insulation thickness.

END OF SECTION 23 07 00

SECTION 23 09 93
SEQUENCE OF OPERATIONS FOR HVAC CONTROLS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes sequence of operation for:

1. HVAC Units

2. ERV Air Systems

B. Related Sections:

1. Section 23 09 00 - Instrumentation and Control for HVAC: For equipment, devices, and system components to implement sequences of operation.

1.02 SUBMITTALS

A. Shop Drawings: Indicate mechanical system controlled and control system components.

1. Label with settings, adjustable range of control and limits. Submit written description of control sequence.

1.03 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of components and set points of controls, including changes to sequences made after submission of shop drawings.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 HEAT PUMPS

A. Run Conditions - Scheduled:

1. The unit shall run according to a user definable time schedule in the following modes:

a. Occupied Mode: The unit shall maintain

b. 74°F (adj.) cooling setpoint

c. 70°F (adj.) heating setpoint

2. Unoccupied Mode (night setback): The unit shall maintain

a. 85°F (adj.) cooling setpoint.

b. 55°F (adj.) heating setpoint.

3. Alarms shall be provided as follows:

a. High Zone Temp: If the zone temperature is greater than the cooling setpoint by a user definable amount (adj.).

b. Low Zone Temp: If the zone temperature is less than the heating setpoint by a user definable amount (adj.).

4. Zone Setpoint Adjust:

a. The occupant shall be able to adjust the zone temperature heating and cooling setpoints at the zone sensor.

5. Zone Optimal Start:

a. The unit shall use an optimal start algorithm for morning start-up. This algorithm shall minimize the unoccupied warm-up or cool-down period while still achieving comfort conditions by the start of scheduled occupied period.

6. Zone Unoccupied Override:

a. A timed local override control shall allow an occupant to override the schedule and place the unit into an occupied mode for an adjustable period of time. At the expiration of this time, control of the unit shall automatically return to the schedule.

7. Fan:

a. The fan shall run anytime heating or cooling is required, unless shutdown or on safeties.

8. The controller shall measure the zone temperature and cycle compressor as required to maintain cooling setpoint. Heat pump shall run subject to its own internal safeties and controls.

a. The heating shall be enabled whenever:

1) Outside air temperature is less than 65 degrees F.

2) AND the fan status is on.

b. The cooling shall be enabled whenever:

1) Outside air temperature is greater than 60 degrees F.

2) AND the fan status is on.

3.02 ERV AIR SYSTEMS

A. Run Conditions - Scheduled:

1. The unit shall run according to a user definable time schedule.

B. Emergency Shutdown:

1. The unit shall shut down and generate an alarm upon receiving an emergency shutdown signal.

C. Outside Air/Exhaust Air Dampers:

1. The outside air and exhaust air dampers shall open anytime the unit runs and shall close anytime the unit stops. The supply fan shall start only after the damper status has proven the damper is open.

END OF SECTION 23 09 93

SECTION 23 31 00
HVAC DUCTS AND CASINGS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Duct Materials.
2. Insulated flexible ducts.
3. Single wall spiral round ducts.
4. Transverse duct connection system.
5. Ductwork fabrication.

B. Related Sections:

1. Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment: Product requirements for hangers, supports and sleeves for placement by this section.
2. Section 23 33 00 - Air Duct Accessories: Product requirements for duct accessories for placement by this section.

1.02 REFERENCES

A. ASTM International:

1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
2. ASTM A90/A90M - Standard Test Method for Weight Mass of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.
3. ASTM A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
4. ASTM A568/A568M - Standard Specification for Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.
5. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
6. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
7. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
8. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

9. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

B. National Fire Protection Association:

1. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.

2. NFPA 90B - Standard for the Installation of Warm Air Heating and Air Conditioning Systems.

3. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations.

C. Sheet Metal and Air Conditioning Contractors:

1. SMACNA - HVAC Air Duct Leakage Test Manual.

2. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.

D. Underwriters Laboratories Inc.:

1. UL 181 - Factory-Made Air Ducts and Connectors.

1.03 PERFORMANCE REQUIREMENTS

A. Variation of duct configuration or sizes other than those of equivalent or lower loss coefficient is not permitted except by written permission. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts.

1.04 SUBMITTALS

A. Shop Drawings: Submit duct fabrication drawings, drawn to scale not smaller than 1/8 inch equals 1 foot, on drawing sheets same size as Contract Documents, indicating:

1. Fabrication, assembly, and installation details, including plans, elevations, sections, details of components, and attachments to other work.

2. Duct layout, indicating pressure classifications and sizes in plan view. For exhaust duct systems, indicate classification of materials handled as defined in this section.

3. Fittings.

4. Reinforcing details and spacing.

5. Seam and joint construction details.

6. Penetrations through fire rated and other walls.

7. Terminal unit, coil, and humidifier installations.

8. Hangers and supports, including methods for building attachment, vibration isolation, and duct attachment.

B. Product Data: Submit data for duct materials, duct liner and duct connectors.

1.05 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with SMACNA - HVAC Duct Construction Standards - Metal and flexible.

B. Construct ductwork to NFPA 90A and NFPA 90B and NFPA 96 standards.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Do not install duct sealant when temperatures are less than those recommended by sealant manufacturers.

B. Maintain temperatures during and after installation of duct sealant.

1.08 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.09 WARRANTY

A. Furnish one year manufacturer warranty for ducts.

PART 2 - PRODUCTS

2.01 DUCT MATERIALS

A. Galvanized Steel Ducts: ASTM A653/A653M galvanized steel sheet, lock-forming quality, having G90 zinc coating of in conformance with ASTM A90/A90M.

B. Steel Ducts: ASTM A1008/A1008M, ASTM A1011/A1011M and ASTM A568/A568M.

C. Aluminum Ducts: ASTM B209; aluminum sheet, alloy 3003-H14. Aluminum Connectors and Bar Stock: Alloy 6061-T6 or of equivalent strength.

D. Stainless Steel Ducts: ASTM A167, Type 316.

E. Fasteners: Rivets, bolts, or sheet metal screws.

F. Hanger Rod: ASTM A36/A36M; steel; threaded both ends, threaded one end, or continuously threaded.

2.02 INSULATED FLEXIBLE DUCTS

A. Manufacturers:

1. JPL MHP

2. Hart & Cooley

B. Product Description: Flexible duct shall be constructed with a spring steel wire helix, encapsulated in a 2-ply, air-tight inner core. Fiberglass insulation of R4.2 encompass the core and a metalized, reinforced vapor barrier shall surround the entire duct.

1. Pressure Rating: 6 inches wg positive and 1.0 inches wg negative.

2. Maximum Velocity: 5,000 fpm.

3. Temperature Range: 0 degrees F to 200 degrees F.

4. Thermal Resistance: 4.2 square feet-hour-degree F per BTU.

2.03 SINGLE WALL SPIRAL ROUND DUCTS

A. Product Description: UL 181, Class 1, round spiral lockseam duct constructed of galvanized steel.

B. Construct duct with the following minimum gages:

Diameter	Gauge
3 inches to 14 inches	26
15 inches to 26 inches	24
28 inches to 36 inches	22
38 inches to 50 inches	20
52 inches to 84 inches	18

C. Construct fittings with the following minimum gages:

Diameter	Gauge
3 inches to 14 inches	24
15 inches to 26 inches	22
28 inches to 36 inches	20
38 inches to 50 inches	20
52 inches to 60 inches	18
62 inches to 84 inches	16

2.04 TRANSVERSE DUCT CONNECTION SYSTEM

A. Manufacturers:

1. Ductmate

B. Product Description: SMACNA "F" rated rigidity class connection, interlocking angle and duct edge connection system with sealant, gasket, cleats, and corner clips.

2.05 DUCTWORK FABRICATION

A. Fabricate and support rectangular ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

B. Fabricate and support round ducts with longitudinal seams in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible (Round Duct Construction Standards). Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

C. Construct T's, bends, and elbows with minimum radius 1-1/2 times centerline duct width. Where not possible and where rectangular elbows are used, provide turning vanes. Where acoustical lining is indicated, furnish turning vanes of perforated metal with glass fiber insulation.

D. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

E. Fabricate continuously welded round and oval duct fittings two gages heavier than duct gages indicated in SMACNA Standard. Minimum 4 inch cemented slip joint, brazed or electric welded. Prime coat welded joints.

F. Provide standard 45-degree lateral wye takeoffs. When space does not allow 45-degree lateral wye takeoff, use 90-degree conical tee connections.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify sizes of equipment connections before fabricating transitions.

3.02 INSTALLATION

A. Install and seal ducts in accordance with SMACNA HVAC Duct Construction Standards – Metal and Flexible.

B. During construction, install temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

C. Use crimp joints with or without bead or beaded sleeve couplings for joining round duct sizes 8 inch and smaller.

D. Use double nuts and lock washers on threaded rod supports.

E. Connect flexible ducts to metal ducts with draw bands.

F. Set plenum doors 6 to 12 inches above floor. Arrange door swing so fan static pressure holds door in closed position.

G. Install kitchen range hoods in accordance with NFPA 96.

H. Install residue traps in kitchen hood exhaust ducts at base of vertical risers with provisions for clean out.

I. Kitchen hood exhaust ducts:Use stainless steel for ductwork exposed to view and stainless steel or carbon steel where ducts are concealed.

3.03 EXTERIOR DUCTWORK

A. Installation: Follow all manufacturers installation instructions.

B. Support:

1. Supports on straight runs of exterior ductwork systems shall be positioned at center's not exceeding 10 ft for ductwork sections fabricated in 10 ft lengths, and 13 ft for ductwork sections fabricated in 13 ft lengths.

2. Additionally, ductwork shall be supported at changes of direction, at branch duct connections, tee fittings and etc.

3. All ductwork accessories such as dampers shall be independently supported.

C. Storage And Handling:

1. Care shall be exercised in the handling and transportation of exterior ductwork sections in order to prevent physical damage.

2. All exterior ductwork sections shall be stored under cover, clear of the ground or roof and protected from the weather and sunlight by an opaque and light colored waterproof material. In cases where the ductwork sections are to be stored for prolonged periods, the open ends of the ductwork sections shall be sealed with a polythene sheet or other suitable material to prevent the ingress of foreign matter.

3.04 INTERFACE WITH OTHER PRODUCTS

A. Install openings in ductwork where required to accommodate thermometers and controllers. Install pitot tube openings for testing of systems. Install pitot tube complete with metal can with spring device or screw to prevent air leakage. Where openings are provided in insulated ductwork, install insulation material inside metal ring.

B. Connect [air outlets and inlets to supply ducts directly or with five foot maximum length of flexible duct. Do not use flexible duct to change direction.

3.05 CLEANING

A. Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air flow, clean one half of system completely before proceeding to other half. Protect equipment with potential to be harmed by excessive dirt with temporary filters, or bypass during cleaning.

B. Clean duct systems with high power vacuum machines. Protect equipment with potential to be harmed by excessive dirt with filters, or bypass during cleaning. Install access openings into ductwork for cleaning purposes.

3.06 SCHEDULES

A. Ductwork Material Schedule:

AIR SYSTEM	MATERIAL
Supply (Heating Systems)	Steel
Supply (System with Cooling Coils)	Steel

Return and Relief	Steel
General Exhaust	Steel, Aluminum
Kitchen Hood Exhaust	Steel, Stainless Steel
Dishwasher Exhaust	Steel, Stainless Steel
Fume Hood Exhaust	Stainless Steel
Outside Air Intake	Steel
Combustion Air	Steel
Evaporative Condenser	Steel

B. Ductwork Pressure Class Schedule:

AIR SYSTEM	PRESSURE CLASS
Constant Volume Supply	1 inch wg regardless of velocity.
Variable Air Volume Supply (downstream of VAV boxes)	1 inch wg regardless of velocity.
Variable Air Volume Supply (upstream of VAV boxes)	3 inch wg
Supply (Heating Systems)	1/2 inch wg
Supply (System with Cooling Coils)	1/2 inch wg
Return and Relief	1/2 inch wg regardless of velocity.
General Exhaust	1/2 inch wg regardless of velocity.
Dishwasher Exhaust	1/2 inch wg
Fume Hood Exhaust	2 inch wg

END OF SECTION 23 31 00

SECTION 23 33 00
AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Back-draft dampers.
2. Duct access doors.
3. Volume control dampers.
4. Flexible duct connections.
5. Duct test holes.

B. Related Sections:

1. Section 23 09 00 - Instrumentation and Control for HVAC: Execution and Product requirements for connection and control of Combination Smoke and Fire Dampers for placement by this section.
2. Section 23 31 00 - HVAC Ducts and Casings: Requirements for duct construction and pressure classifications.
3. Section 26 05 03 - Equipment Wiring Connections: Execution requirements for connection of electrical Combination Smoke and Fire Dampers specified by this section.

1.02 REFERENCES

A. Air Movement and Control Association International, Inc.:

1. AMCA 500 - Test Methods for Louvers, Dampers, and Shutters.

B. National Fire Protection Association:

1. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.
2. NFPA 92A - Recommended Practice for Smoke-Control Systems.

C. Sheet Metal and Air Conditioning Contractors:

1. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.

D. Underwriters Laboratories Inc.:

1. UL 555 - Standard for Safety for Fire Dampers.
2. UL 555C - Standard for Safety for Ceiling Dampers.
3. UL 555S - Standard for Safety for Smoke Dampers.

1.03 SUBMITTALS

A. Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers and duct access doors.

B. Product Data: Submit data for shop fabricated assemblies and hardware used.

C. Product Data: Submit for the following. Include where applicable electrical characteristics and connection requirements.

1. Backdraft dampers.

2. Flexible duct connections.

3. Volume control dampers.

4. Duct access doors.

D. Manufacturer's Installation Instructions: Submit for Fire and Combination Smoke and Fire Dampers.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.04 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of access doors.

B. Operation and Maintenance Data: Submit for Combination Smoke and Fire Dampers.

1.05 QUALITY ASSURANCE

A. Dampers tested, rated and labeled in accordance with the latest UL requirements.

B. Damper pressure drop ratings based on tests and procedures performed in accordance with AMCA 500.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect dampers from damage to operating linkages and blades.

B. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer and material.

C. Storage: Store materials in a dry area indoor, protected from damage.

D. Handling: Handle and lift dampers in accordance with manufacturer's instructions. Protect materials and finishes during handling and installation to prevent damage.

1.07 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.08 COORDINATION

A. Coordinate Work where appropriate with building control Work.

1.09 WARRANTY

A. Furnish one (1) year manufacturer warranty for duct accessories.

B. Include copy of the warranty certificate in Operations and Maintenance Manual.

PART 2 - PRODUCTS

2.01 BACK-DRAFT DAMPERS

A. Manufacturers:

1. Greenheck WD

2. Ruskin CMBD2

B. Product Description: Multi-Blade, back-draft dampers: Parallel-action, gravity-balanced, galvanized16 gage thick steel frame. Aluminum blades, maximum 6 inch width, with felt or flexible vinyl sealed edges. Blades linked together in rattle-free manner with 90-degree stop, steel ball bearings, and plated steel pivot pin. Furnish dampers with adjustment device to permit setting for varying differential static pressure.

2.02 DUCT ACCESS DOORS

A. Manufacturers:

1. Milcor 3208 or 3210

2. Elmdor

B. Access Doors: Bonderized steel, 20-gage doors and 16-gage frames, with flush screw driver operated cam latch, fitted with concealed hinges, factory prime coated.

C. Access panels shall be Milcor Style AT for acoustical tile, Style K with expanded metal wings for plaster, Style M for masonry, tile and drywall and style DW for gypsum board walls and ceilings.

D. Access doors and panels in fire rated construction shall have UL 1-1/2 hour B label.

2.03 VOLUME CONTROL DAMPERS

A. Manufacturers:

1. Greenheck.

2. Ruskin.

B. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.

C. Splitter Dampers:

1. Material: Same gage as duct to 24 inches size in both dimensions, and two gages heavier for sizes over 24 inches.

2. Blade: Fabricate of single double thickness sheet metal to streamline shape, secured with continuous hinge or rod.

3. Operator: Minimum 1/4 inch diameter rod in self aligning, universal joint action, flanged bushing with set screw.

4. Single Blade Dampers: Fabricate for duct sizes up to 6 x 30 inch.

D. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 x 72 inch. Assemble center and edge crimped blades in prime coated or galvanized frame channel with suitable hardware.

E. End Bearings: Except in round ductwork 12 inches and smaller, furnish end bearings. On multiple blade dampers, furnish oil-impregnated nylon or sintered bronze bearings. Furnish closed end bearings on ducts having pressure classification over 2 inches wg.

F. Quadrants:

1. Furnish locking, indicating quadrant regulators on single and multi-blade dampers.

2. On insulated ducts mount quadrant regulators on standoff mounting brackets, bases, or adapters.

3. Where rod lengths exceed 30 inches furnish regulator at both ends.

4. Model ICS-385 Manufactured by Duro Dyne.

2.04 FLEXIBLE DUCT CONNECTIONS

A. Manufacturers:

1. Duro-Dyne, Model Durolon.

B. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated on Drawings.

C. Connector: Fabric crimped into metal edging strip.

1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric conforming to NFPA 90A, minimum density 30 oz per sq yd.

2. Net Fabric Width: Approximately 3 inches wide.

3. Metal: 3 inch wide, 24 gage galvanized steel.

2.05 DUCT TEST HOLES

A. Manufacturers:

B. Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Furnish extended neck fittings to clear insulation.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify rated walls are ready for fire damper installation.

B. Verify ducts and equipment installation are ready for accessories.

C. Check location of air outlets and inlets and make necessary adjustments in position to conform to architectural features, symmetry, and lighting arrangement.

3.02 INSTALLATION

A. Install in accordance with NFPA 90A, and follow SMACNA HVAC Duct Construction Standards – Metal and Flexible. Refer to Section 23 31 00 for duct construction and pressure class.

B. Install back-draft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated on Drawings.

C. Access Doors: Install access doors at the following locations and as indicated on Drawings:

1. Spaced every 50 feet of straight duct.

2. Upstream of each elbow.

3. Upstream of each reheat coil.

4. Before and after each duct mounted filter.

5. Before and after each duct mounted coil.

6. Before and after each duct mounted fan.

7. Before and after each automatic control damper.

8. Before and after each combination fire and smoke damper.

9. Downstream of each VAV box.

10. Install at locations for cleaning kitchen exhaust ductwork in accordance with NFPA 96.

D. Access Door Sizes: Install minimum 8 x 8 inch size for hand access, 18 x 18 inch size for shoulder access, and as indicated on Drawings. Review locations prior to fabrication.

E. Install temporary duct test holes where indicated on Drawings and required for testing and balancing purposes. Cut or drill in ducts. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

F. [Install combination fire and smoke dampers at locations as indicated on Drawings. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges.

1. Install smoke dampers and combination smoke and fire dampers in accordance with NFPA 92A.

2. Install dampers square and free from racking with blades running horizontally.

3. Do not compress or stretch damper frame into duct or opening.

4. Handle damper using sleeve or frame. Do not lift damper using blades, actuator, or jack shaft.

5. Install bracing for multiple section assemblies to support assembly weight and to hold against system pressure. Install bracing as needed.

3.03 DEMONSTRATION

A. Demonstrate re-setting of fire dampers to Owner's representative.

END OF SECTION 23 33 00

SECTION 23 34 00
HVAC FANS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Energy recovery ventilator.

B. Related Sections:

1. Section 23 07 00 - HVAC Insulation: Product requirements for power ventilators for placement by this section.

2. Section 23 09 00 - Instrumentation and Control for HVAC: Product requirements for control components to interface with fans.

3. Section 23 31 00 - HVAC Ducts and Casings: Product requirements for hangers for placement by this section.

4. Section 23 33 00 - Air Duct Accessories: Product requirements for duct accessories for placement by this section.

1.02 REFERENCES

A. American Bearing Manufacturers Association:

1. ABMA 9 - Load Ratings and Fatigue Life for Ball Bearings.

2. ABMA 11 - Load Ratings and Fatigue Life for Roller Bearings.

B. Air Movement and Control Association International, Inc.:

1. AMCA 99 - Standards Handbook.

2. AMCA 204 - Balance Quality and Vibration Levels for Fans.

3. AMCA 210 - Laboratory Methods of Testing Fans for Aerodynamic Performance Rating.

4. AMCA 300 - Reverberant Room Method for Sound Testing of Fans.

5. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data.

C. American Refrigeration Institute:

1. ARI 1060 - Air-to-Air Energy Recovery Ventilation Equipment Certification Equipment Program.

D. National Electrical Manufacturers Association:

1. NEMA MG 1 - Motors and Generators.

E. Underwriters Laboratories Inc.:

1. UL 705 - Power Ventilators.

1.03 SUBMITTALS

A. Shop Drawings: Indicate size and configuration of fan assembly, mountings, weights, ductwork and accessory connections.

B. Product Data: Submit data on each type of fan and include accessories, fan curves with specified operating point plotted, power, RPM, sound power levels for both fan inlet and outlet at rated capacity, electrical characteristics and connection requirements.

C. Manufacturer's Installation Instructions: Submit fan manufacturers instructions.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.04 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Submit instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.05 QUALITY ASSURANCE

A. Performance Ratings: Conform to AMCA 210 and bear AMCA Certified Rating Seal.

B. Sound Ratings: AMCA 301, tested to AMCA 300,and bear AMCA Certified Sound Rating Seal.

C. UL Compliance: UL listed and labeled, designed, manufactured, and tested in accordance with UL 705.

D. Balance Quality: Conform to AMCA 204.

E. Energy Recovery Unit Wheel Energy Transfer Rating: Meet ARI 1060.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect motors, shafts, and bearings from weather and construction dust.

1.07 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.08 WARRANTY

A. Furnish one year manufacturer’s warranty for fans.

1.09 MAINTENANCE SERVICE

A. Furnish service and maintenance of fans for one year from Date of Substantial Completion.

B. Examine fan components bi-monthly. Clean, adjust, and lubricate equipment.

C. Include systematic examination, adjustment, and lubrication of fans, and controls checkout and adjustments. Repair or replace parts in accordance with manufacturer's operating and maintenance data. Use parts produced by manufacturer of original equipment.

D. Perform work without removing fans from service during building normal occupied hours.

E. Provide emergency call back service during working hours for this maintenance period.

F. Maintain locally, near Place of the Work, adequate stock of parts for replacement or emergency purposes. Have personnel available to ensure fulfillment of this maintenance service, without unreasonable loss of time.

G. Perform maintenance work using competent and qualified personnel under supervision of manufacturer or original installer.

PART 2 - PRODUCTS

2.01 ENERGY RECOVERY VENTILATOR

A. Manufacturer:

1. Mitsubishi Lossnay

2. Daikin

B. General: The unit shall be equipped with heat exchanger, outside air bypass damper for energy recovery ventilation, data network control and be directly connectable to the communication control network serving other systems from this manufacturer.

C. The ERV unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, control circuit board and blowers with motors, filters, and insulated foam air guides. The unit shall have factory installed inlet air thermistors, control board with functions for local, remote, and optional control modes.

D. Cabinet: The cabinet shall be fabricated of galvanized steel, and covered with polyurethane foam insulation as necessary with steel mounting points securely attached

E. Blowers: The unit shall be furnished with direct drive centrifugal blowers running simultaneously supplying and extracting air at the same rate for balanced ventilation air flow.

F. Heat Exchanger: The enthalpic heat exchanger element shall be constructed of specially treated cellulous fiber membrane separated by corrugated layers to allow total heat (sensible and latent) energy recovery from the exhaust air to the supply air or from the supply air to the exhaust air as determined by design conditions.

G. Bypass Damper: The ERV shall have an automatic supply side by-pass damper to allow inbound ventilation air to by-pass the heat exchanger element when factory-installed thermistors measure outside ambient temperature being at least 7 degrees cooler than air returned from interlocked indoor units running in cooling mode. The mechanism for opening and closing the bypass damper shall be a 208V-230V synchronous electric motor through an actuator. The motor will drive a steel cable connected to a mechanical damper flap to allow fresh air to bypass the element.

H. Filter: The ERV shall be equipped with factory installed, washable air filters located at each intake face (both supply and exhaust sides) of the heat exchanger element to clean the air and prevent clogging.

I. Electrical: The units shall be 208-230Volt, 1 Phase, 60Hz power. ERV control board shall allow independent control by contact closure from third-party sensor-driven controllers, switches, or timers.

PART 3- EXECUTION

3.01 INSTALLATION

A. Suspended Cabinet Fans: Install flexible connections between fan and ductwork. Ensure metal bands of connectors are parallel with minimum one inch flex between ductwork and fan while running.

B. Provide backdraft dampers on outlet from cabinet and ceiling fans and as indicated on Drawings.

C. Install safety screen where inlet or outlet is exposed.

D. Pipe scroll drains to nearest floor drain.

E. Install backdraft dampers on discharge of exhaust fans and as indicated on Drawings.

F. Provide sheaves required for final air balance.

3.02 CLEANING

A. Vacuum clean coils and inside of fan cabinet.

B. Demonstrate fan operation and maintenance procedures.

C. Do not operate fans for until ductwork is clean, filters in place, bearings lubricated, and fan has been test run under observation.

END OF SECTION 23 34 00

SECTION 23 37 00
AIR OUTLETS AND INLETS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Diffusers.
2. Registers
3. Grilles.
4. Louvers.

B. Related Sections:

1. Section 23 33 00 - Air Duct Accessories: Volume dampers for inlets and outlets.

1.02 REFERENCES

A. Air Movement and Control Association International, Inc.:

1. AMCA 500 - Test Methods for Louvers, Dampers, and Shutters.

B. American Society of Heating, Refrigerating and Air-Conditioning Engineers:

1. ASHRAE 70 - Method of Testing for Rating the Performance of Air Outlets and Inlets.

C. Sheet Metal and Air Conditioning Contractors:

1. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.

1.03 SUBMITTALS

A. Product Data: Submit sizes, finish, and type of mounting. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

B. Test Reports: Rating of air outlet and inlet performance.

C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.04 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of air outlets and inlets.

1.05 QUALITY ASSURANCE

A. Test and rate diffuser, register, and grille performance in accordance with ASHRAE 70.

B. Test and rate louver performance in accordance with AMCA 500.

1.06 WARRANTY

A. Furnish one year manufacturer warranty for air outlets and inlets.

PART 2 - PRODUCTS

2.01 RECTANGULAR CEILING DIFFUSERS

A. Manufacturers:

1. Titus Model MCD

2. Tuttle and Bailey

B. Type: Square, adjustable pattern, stamped, multi-core diffuser to discharge air in 360 degree, four-way pattern.

C. Frame: Surface mount or inverted T-bar type.

D. Fabrication: Steel with baked enamel white finish.

E. Accessories: Radial opposed-blade damper and multi-louvered equalizing grid with damper adjustable from diffuser face.

2.02 EXHAUST AND RETURN REGISTERS/GRILLES

A. Manufacturer:

1. Titus 350 RL

2. Tuttle and Bailey

B. Steel return grilles shall have ¾-inch blade spacing. Grilles of the sizes and mounting types shown on the schedule. The fixed deflection blades shall be available parallel to the long or short dimension of the grille. Construction shall be of steel with a 1¼-inch wide border on all sides. Screw holes shall be countersunk for a neat appearance. Corners shall be welded with full penetration resistance welds.

C. Deflection blades shall be contoured to a specifically designed and tested cross-section to meet published test performance data. Blades shall be firmly held in place by mullions from behind the grille and fixed to the grille by welding in place. Blade deflection angle shall be available at 35°.

D. Provide opposed-blade volume damper as scheduled. Damper shall be constructed of heavy gauge steel. Damper must be operable from the face of the grille.

E. The grille finish shall be #26 white. The finish shall be an anodic acrylic paint, baked at 315° F for 30 minutes.

2.03 CEILING GRID CORE EXHAUST AND RETURN REGISTERS/GRILLES

A. Manufacturer:

1. Titus 50F

2. Tuttle and Bailey

B. Return grilles shall be the sizes and mounting types as shown on the schedule. Return grilles must provide a free area of at least 90%. Outer borders shall be constructed of heavy extruded aluminum with a thickness of 0.040-0.050 inch and shall have countersunk screw holes for a neat appearance. Border width shall be 1¼ inches on all sides and shall be interlocked at the four corners and mechanically staked to form a rigid frame. Aluminum grid shall be 1 x 1 x 1 inch.

C. The grille finish shall be #26 white. The finish shall be an anodic acrylic paint, baked at 315°F for 30 minutes.

2.04 LOUVERS

A. Manufacturers:

1. Ruskin

2. Greenheck

B. Fabrication: Stationary drainable type.

1. Design: Drainable blades shall be contained within the frame with downspouts in jambs and mullions. Standard or flanged construction as scheduled or required.

2. Frame:
   a. Frame Depth: 4 inches.
   b. Wall Thickness: 18 gage, nominal.
   c. Material: Roll formed galvanized steel.

3. Blades:
   a. Style: Drainable. 37-1/2 degree angle on 3-1/2 inches centers.
   b. Wall Thickness: 18 gage, nominal.
   c. Material: Roll formed galvanized steel.

C. Performance Data:

1. Based on testing 48 inch x 48 inch size unit in accordance with AMCA 500.

2. Free Area: 51 percent, nominal.

3. Free Area Size: 8.23 square feet.

4. Maximum Recommended Air Flow Through Free Area: 961 feet per minute.

5. Air Flow: 7909 cubic feet per minute.

6. Maximum Pressure Drop (Intake): 0.10 inches w.g..

D. Louvers shall be factory engineered to withstand the specified seismic loads.

1. Minimum design loads shall be calculated to comply with ASCE – 7, or local requirements of Authority Having Jurisdiction (AHJ).

E. ACCESSORIES

1. Insulated Blank-Off Panels: 20 gage galvanized steel sheet, 1 inch galvanized steel skin insulated core, factory installed with removable fasteners and neoprene gaskets.

2. Bird Screen:
   a. Galvanized Steel: 1/2 inch by 19 gage.
   b. Frame: Removable.

F. FINISHES

1. Finish: Mill finish.

PART 3- EXECUTION

3.01 EXAMINATION

A. Verify inlet and outlet locations.

B. Verify ceiling and wall systems are ready for installation.

3.02 INSTALLATION

A. Install diffusers to ductwork with airtight connection.

B. Install balancing dampers on duct take-off to diffusers, grilles, and registers, whether or not dampers are furnished as part of diffuser, grille, and register assembly.

C. Paint visible portion of ductwork behind air outlets and inlets matte black.

3.03 INTERFACE WITH OTHER PRODUCTS

A. Check location of outlets and inlets and make necessary adjustments in position to conform to architectural features, symmetry, and lighting arrangement.

END OF SECTION 23 37 00

SECTION 23 81 26 – SPLIT-SYSTEM AIR CONDITIONERS

PART 1- GENERAL

1.01 SUMMARY

A. Section Includes:

1. Ductless Split System Heat Pumps
2. Refrigerant Line Sets
3. Condensate Drain Piping

B. Related Sections:

1. Section 23 09 93 - Sequence of Operations for HVAC Controls: Sequences of operation applying to units in this section.
2. Section 23 33 00 - Air Duct Accessories: Flexible connections.

1.02 REFERENCES

A. Air-Conditioning and Refrigeration Institute:

1. ARI 210/240 - Unitary Air-Conditioning and Air-Source Heat Pump Equipment.
2. ARI 270 - Sound Rating of Outdoor Unitary Equipment.
3. ARI 340/360 - Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment.
4. ARI 365 - Commercial and Industrial Unitary Air-Conditioning Condensing Units.

B. American Society of Heating, Refrigerating and Air-Conditioning Engineers:

1. ASHRAE 52.1 - Gravimetric and Dust-Spot Procedures for Testing Air-Cleaning Devices Used in General Ventilation for Removing Particulate Matter.
2. ASHRAE 90.1 - Energy Standard for Buildings Except Low-Rise Residential Buildings.

C. National Electrical Manufacturers Association:

1. NEMA MG 1 - Motors and Generators.

D. National Fire Protection Association:

1. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.

1.03 SUBMITTALS

A. Product Data: Submit data indicating:

1. Cooling and heating capacities.
2. Dimensions.
3. Weights.
4. Rough-in connections and connection requirements.
5. Duct connections.
6. Electrical requirements with electrical characteristics and connection requirements.
7. Controls.
8. Accessories.

1.04 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of controls installed remotely from units.

B. Operation and Maintenance Data: Submit manufacturer's descriptive literature, operating instructions, installation instructions, and maintenance and repair data.

1.05 QUALITY ASSURANCE

A. Performance Requirements: Energy Efficiency Rating (EER) not less than prescribed by ASHRAE 90.1 when used in combination with compressors and evaporator coils when tested in accordance with ARI 210/240 or ARI 340/360.

B. Cooling Capacity: Rate in accordance with ARI 210/240, ARI 340/360, ARI 365].

C. Sound Rating: Measure in accordance with ARI 270.

D. Insulation and adhesives: Meet requirements of NFPA 90A.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Accept units and components on site in factory protective containers, with factory shipping skids and lifting lugs. Inspect for damage.

B. Comply with manufacturer's installation instruction for rigging, unloading and transporting units.

C. Protect units from weather and construction traffic by storing in dry, roofed location.

1.07 COORDINATION

A. Coordinate installation of condensing units with concrete pad or roof structure.

1.08 WARRANTY

A. Furnish five year manufacturers warranty for compressors.

PART 2 - PRODUCTS

2.01 DUCTLESS SPLIT SYSTEM HEAT PUMPS

A. Manufacturers:

1. Mitsubishi

2. Daikin

B. OUTDOOR UNITS

1. General: The outdoor units shall be specifically designed to work with the indoor models. The outdoor unit shall be completely factory assembled, piped and wired. Each unit shall be run tested at the factory prior to shipment.

2. Unit Cabinet:

a. The casing shall be fabricated of galvanized steel, bonderized, finished with an electrostatically applied, thermally fused acrylic or polyester powder coating for corrosion protection. Assembly hardware shall be cadmium plated for weather resistance.

b. Two (2) mild steel mounting feet, traverse mounted across the cabinet base pan, welded mount, providing four (4) slotted mounting holes shall be furnished.

3. Fan:

a. The unit shall be furnished with a direct drive, high performance propeller type fan.

b. The condenser fan motor shall be a variable speed, direct current (DC) motor and shall have permanently lubricated bearings.

c. Fan speed shall be switch automatically according to the number of operating indoor units and the compressor operating frequency.

d. The fan motor shall be mounted with vibration isolation for quiet operation.

e. The fan shall be provided with a raised guard to prevent contact with moving parts.

f. The outdoor unit shall have horizontal discharge airflow.

4. Coil:

a. The outdoor unit coil shall be of nonferrous construction with lanced or corrugated plate fins on copper tubing.

b. The coil shall be protected with an integral guard.

c. Refrigerant flow from the outdoor unit to the indoor units shall be independently controlled by means of individual electronic linear expansion valves for each indoor unit.

d. Outdoor unit shall be pre-charged with sufficient R-410a refrigerant for up to one hundred and thirty-one (131) feet of refrigerant piping.

e. All refrigerant lines between outdoor and indoor units shall be of annealed, refrigeration grade copper tubing, ARC Type, meeting ASTM B280 requirements, individually insulated in twin-tube, flexible, closed-cell, CFC-free (ozone depletion potential of zero), elastomeric material for the insulation of refrigerant pipes and tubes with thermal conductivity equal to or better than 0.27 BTU-inch/hour per Sq Ft / °F, a water vapor transmission equal to or better than 0.08 Perm-inch and superior fire ratings such that insulation will not contribute significantly to fire and up to 1" thick insulation shall have a Flame-Spread Index of less than 25 and a Smoke-development Index of less than 50 as tested by ASTM E 84 and CAN / ULC S-102.

f. All refrigerant connections between outdoor and indoor units shall be flare type.

5. Compressor:

a. The compressor shall be a high performance, hermetic, inverter driven, variable speed, dual rotary type.

b. The compressor motor shall be direct current (DC) type equipped with a factory supplied and installed inverter drive package.

c. The outdoor unit shall be equipped with a suction side refrigerant accumulator.

d. The compressor will be equipped with an internal thermal overload.

e. The compressor shall be mounted to avoid the transmission of vibration.

6. Piping Requirements:

a. The outdoor unit must have the ability to operate within the designed refrigerant piping and height limitations without the need for line size changes, traps or additional oil.

7. Electrical:

a. The unit electrical power shall be 208/230 volts, 1-phase, 60 hertz.

b. The unit shall be capable of satisfactory operation within voltage limits of 198 volts to 253 volts.

c. The outdoor unit shall be controlled by the microprocessors located in the indoor unit and in the outdoor unit communicating system status, operation, and instructions digitally over A-Control – a system directing that the indoor unit be powered directly from the outdoor unit using a 3-wire, 14 ga. AWG connection plus ground.

d. The outdoor unit shall be equipped with Pulse Amplitude Modulation (PAM) compressor inverter drive control for maximum efficiency with minimum power consumption.

C. INDOOR UNITS

1. The indoor unit shall be factory assembled, wired and tested. Contained within the unit shall be all factory wiring and internal piping, control circuit board and fan motor. The unit, in conjunction with the wired wall-mounted, wireless wall-mounted or wireless handheld controller, shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, and a test run switch. Indoor unit and refrigerant pipes shall be purged with dry air before shipment from the factory.

2. Unit Cabinet: The cabinet shall be formed from high strength molded plastic with smooth finish, flat front panel design with access for filter. The unit shall be wall mounted by means of a factory supplied, pre-drilled, mounting plate.

3. Fan: The indoor unit fan shall be high performance, double inlet, forward curve, direct drive sirocco fan with a single motor. The fans shall be statically and dynamically balanced and run on a motor with permanently lubricated bearings. The indoor fan shall consist of three (3) speeds: Low, Mid, and Hi and Auto. The fan shall have a selectable Auto fan setting that will adjust the fan speed based on the difference between controller set-point and space temperature.

4. Vane: There shall be a motorized horizontal vane to automatically direct air flow in a horizontal and downward direction for uniform air distribution. The horizontal vane shall significantly decrease downward air resistance for lower sound levels, and shall close the outlet port when operation is stopped. There shall also be a set of vertical vanes to provide horizontal swing airflow movement.

5. Filter: Return air shall be filtered by means of an easily removable washable filter.

6. Coil: The evaporator coil shall be of nonferrous construction with pre-coated aluminum strake fins on copper tubing. The multi-angled heat exchanger shall have a modified fin shape that reduces air resistance for a smoother, quieter airflow. All tube joints shall be brazed with PhosCopper or silver alloy. The coils shall be pressure tested at the factory. A condensate pan and drain shall be provided under the coil. An optional drain pan level switch (DPLS1), designed to connect to the control board, shall be provided if required, and installed on the condensate pan to prevent condensate from overflowing. A condensate mini-pump shall be provided to provide a means of condensate disposal.

7. Electrical: The electrical power of the unit shall be 208 volts or 230 volts, 1 phase, 60 hertz. The system shall be capable of satisfactory operation within voltage limits of 187 volts to 253 volts. The power to the indoor unit shall be supplied from the outdoor unit, using the Mitsubishi Electric A-Control system. For A-Control, a three (3) conductor AWG-14 wire with ground shall provide power feed and bi-directional control transmission between the outdoor and indoor units.

8. System Control: The control system shall consist of a minimum of two (2) microprocessors, one on each indoor and outdoor unit, interconnected by a single non-polar two-wire cable. The microprocessor located in the indoor unit shall have the capability of monitoring return air temperature and indoor coil temperature, receiving and

processing commands from a wireless or wired controller, providing emergency operation and controlling the outdoor unit. The control signal between the indoor and outdoor unit shall be pulse signal 24 volts DC.

9. Wired Remote Controller (PAR-31MAA)

   a. The Wired Remote Controller (Mitsubishi PAR-31MAA) shall be approximately 4.75” x 4.75” x 3/4" in size and white in color with a light-green LCD display. There shall be a built-in weekly timer with up to 8 pattern settings per day. The controller shall consist of an On/Off button, Increase/Decrease Set Temperature buttons, a Cool/Auto/Fan/Dry mode selector, a Timer Menu button, a Timer On/Off button, Set Time buttons, a Fan Speed selector, a Ventilation button, a Test Run button, and a Check Mode button. The controller shall have a built-in temperature sensor. Temperature shall be displayed in either Fahrenheit (°F) or Celsius (°C), and Temperature changes shall be by increments of 1°F. The Mitsubishi PAR-31MAA shall have the capability of controlling up to a maximum of 16 systems, as a group with the same mode and set-point for all, at a maximum developed control cable distance of 1,500 feet.

2.02 REFRIGERANT LINE SETS

A. Manufacturers:
   1. Diamondback
   2. Linesets Inc.
   3. Great Lakes Copper Inc.

B. Twin-tube line set consisting of two copper lines manufactured to ASTMB-280 complete with connect flared connections and flare nuts and minimum 1/2 inch seamless insulation. Insulation shall meet ASTM C-534 and UL94.

2.03 CONDENSATE DRAIN PIPING

A. Schedule 40 PVC with solvent fittings, drainage pattern, for drain piping, ANSI B16.22.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify concrete pad for condensing unit is ready for unit installation.

3.02 INSTALLATION - CONDENSING UNIT

A. Install condensing units on vibration isolators.

B. Install units on concrete foundations.

C. Install refrigerant piping from unit to condensing unit. Install refrigerant specialties furnished with unit.

D. Evacuate refrigerant piping and install initial charge of refrigerant.

E. Install electrical devices furnished loose for field mounting.

F. Install control wiring between air handling unit, condensing unit, and field installed accessories.

G. Install connection to electrical power wiring in accordance with Section 26 05 03.

3.03 MANUFACTURER'S FIELD SERVICES

A. Furnish initial start-up and shutdown during first year of operation, including routine servicing and checkout.

3.04 CLEANING

A. Vacuum clean coils and inside of unit cabinet.

B. Install new throwaway filters in units at Substantial Completion.

3.05 DEMONSTRATION

A. Demonstrate air handling unit operation and maintenance.

B. Demonstrate starting, maintenance, and operation of condensing unit.

C. Furnish services of manufacturer's technical representative for one 8 hour day to instruct Owner's personnel in operation and maintenance of units. Schedule training with Owner.

3.06 PROTECTION OF FINISHED WORK

A. Do not operate air handling units until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.

END OF SECTION 23 81 26

SECTION 26 05 00 – COMMON WORK RESULTS FOR ELECTICAL, COMMUNICATIONS, AND ELECTRONIC SAFETY AND SECURITY

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes general electrical requirements for all Division 26, 27, and 28 work and is supplemental and in addition to the requirements of Division 01.

B. Section Includes:

1. Electrical equipment coordination and installation.
2. Sleeves for raceways and cables.
3. Sleeve seals.
4. Grout.
5. Common electrical installation requirements.

C. General Requirements: Conform to Contract Documents. This section is supplemental and in addition to requirements of Division 01.

D. Conditions and Requirements: Conditions and requirements of the General Provisions, Supplemental General provisions and Special Provisions are hereby made a part of the Electrical Division of this Specification. If requirements disagree, the more stringent requirement will become the contractual obligation.

E. Provide a complete working installation with all equipment called for in proper operating condition. Documents do not undertake to show or list every item to be provided. When an item not shown or specified is clearly necessary for proper operation of equipment shown or specified, provide an item which will allow the system to function at no increase in Contract Sum.

F. Workmanship shall be of the best quality and competent and experienced electricians shall be employed and shall be under the supervision of a competent and experienced foreman.

G. The drawings and specifications are complimentary and what is called for (or shown) in either is required to be provided as if called for in both.

1.2 DEFINITIONS

A. Definitions of all terms shall be in accordance with applicable definitions of:

1. AIA - American Institute of Architects

2. IEEE - Institute of Electrical and Electronic Engineers

3. IES - Illuminating Engineering Society

4. NEMA - National Electrical Manufacturers Association

5. NEC - National Electrical Code

6. IBC - International Building Code

7. IFC - International Fire Code

8. ADA - Americans with Disabilities Act

9. NFPA - National Fire Protection Association

1.3 CODES

A. Codes for installation of electrical work shall be State of Washington Electrical Code, Electrical Safety Code, applicable rules and regulations and OSHA and Washington Industrial Safety and Health Act. Any violation of the above Safety Codes shall be cause for immediate termination of Contractor's authority to proceed with work, and recourse to surety for completion of the project.

1.4 PERMITS AND INSPECTIONS

A. Obtain permits and pay fees required by governmental agencies having jurisdiction over this work.

B. Arrange for inspections required during construction. On completion of work, furnish satisfactory evidence to show all work installed in accordance with codes.

1.5 CLEARANCES

A. Adequate working space shall be provided around electrical equipment for maintenance and operation. Minimum clearances shall conform to Art. 110-26 of NEC.

B. Coordinate clearances with all trades prior to installation.

1.6 TESTS

A. Test all wiring and connections for continuity and grounds before any fixtures or equipment are connected, and run a Megger test. Where such tests indicate faulty insulation or other defects, all such defects and faults shall be located, repaired and tested again.

B. Make check of proper load balance on 3-wire system and on phases of 3-phase system. Check direction of rotation and lubrication on all motors after final service connections have been made.

C. Make final tests in presence of Architect.

1.7 INDUSTRY STANDARDS, CODES AND SPECIFICATIONS

A. All materials, equipment, and systems shall conform to the following applicable Industry Standards, Codes and Specifications:

1. ANSI - American National Standards Institute
2. IEEE - Institute of Electrical and Electronic Engineers
3. IES - Illuminating Engineering Society
4. IPCEA - Insulated Power Cable Engineers Association
5. NFPA - National Fire Protection Association
6. NEMA - National Electrical Manufacturers Association
7. UL - Underwriters Laboratory
8. IBC - International Building Code
9. IFC - International Fire Code
10. IMC - International Mechanical Code
11. ADA - Americans with Disabilities Act (Washington State ADA)
12. WAC - Washington Administrative Code

B. Where differences occur between state laws, local ordinances, industry standards, utility company regulations and the Contract Documents, the most stringent shall govern.

1.8 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Nothing in the Drawings or Specifications shall be construed to permit Work not conforming to applicable laws, ordinances, rules or regulations.
2. When Drawings or Specifications exceed requirements of applicable laws, ordinances, rules, or regulations, comply with documents establishing the more stringent requirements.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Ship equipment in its original package to prevent damage or entrance of foreign matter. Perform all handling and shipping in accordance with manufacturer's recommendations. Provide protective coverings during construction.

B. Identify materials and equipment delivered to the Site to permit check against approved materials list, and reviewed submittals.

1.10 PROJECT CONDITIONS

A. Equipment Rough-In:

1. Rough-in locations for equipment furnished under other Divisions and for equipment furnished by Owner are approximate only. Obtain exact rough-in locations from the following sources:
   a. From Shop Drawings for Contractor provided equipment.
   b. From Architect for Owner furnished, Contractor installed equipment.

1.11 MATERIAL AND EQUIPMENT ENVIRONMENT

A. All equipment and material shall be suitable for the environment of the installation, and the installation including equipment shall satisfy the governmental agencies having jurisdiction.

1.12 DRAWINGS AND SPECIFICATIONS

A. Specifications, with drawings, are intended to cover installation of all electrical equipment. Materials shown and called for on drawings, but not mentioned in specifications, or vice versa, necessary for proper completion and operation of equipment, shall be furnished the same as if called for in both.

B. Electrical drawings do not attempt to show complete details of project construction which affect electrical installations. Refer to architectural, structural and mechanical drawings for additional details which affect installation of this work.

1.13 COORDINATION

A. Coordinate arrangement, mounting, and support of electrical equipment:

1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.

2. To provide for ease of disconnecting the equipment with minimum interference to other installations.

3. To allow right of way for piping and conduit installed at required slope.

4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08 Section "Access Doors and Frames."

D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

E. Before installation Contractor shall make proper provisions for electrical work and to avoid interferences with installation of other work. Any changes caused by neglect to do so shall be made at Contractor's expense.

F. Electrical drawings and specifications shall be compared with drawings and specifications of other trades and any discrepancies between them reported to the Architect prior to installation of work.

G. Coordinate and arrange work so there is no interference between wiring outlets, lighting fixtures, and raceways with sheet metal work, insert hangers, mechanical piping, and structural members.

1.14 CUTTING AND PATCHING

A. Do all cutting and patching for installation of the work. All cutting done carefully to prevent damage to work of other trades, and all patching done by mechanics skilled in the trade affected, and subject to approval by Architect. Provide all work per Division 01. Work shall include:

1. All openings for removed equipment shall be patched or entire system replaced. No openings shall remain at completion of work.

2. Painting: All exposed conduit, boxes, surface metal raceway, enclosures, multi-outlet assemblies shall be painted to match wall color. Where exact color unknown, coordinate with Architect to obtain color. All items shall be painted regardless of whether wall, ceiling, floor finish is painted.

1.15 RUBBISH AND CLEAN-UP

A. Contractor shall promptly remove waste material and rubbish caused by workers.

B. At completion of work, clean all fixtures, electrical panel interiors, and all other equipment installed.

1.16 SCOPE OF WORK

A. Mention herein or indication on drawings of articles, materials, operations or methods, requires that Contractor provide each item mentioned or indicated, of quality, or subject to qualifications noted; perform according to conditions stated, each operation prescribed.

B. Work included under this contract provides for all labor, equipment, and materials to complete all electrical work as outlined in drawings and specifications for project.

1.17 SUBMITTALS

A. General:

1. Submittals shall be in accordance with requirements of Division 01 and as specified.

2. Forward all submittals to the Architect, together, at one time. Individual or incomplete submittals are not acceptable.

3. Organize submittals in same sequence as they appear in Specification Sections.

4. Identify each submittal item by reference to Specification Section paragraph in which item is specified, or Drawing and Detail number.

5. Identify each item by manufacturer, brand, trade name, number, size, rating, or whatever other data is necessary to properly identify and review materials and equipment. Words ″as specified″ are not sufficient identification.

B. Shop Drawings:

1. Show physical arrangement, construction details, finishes, materials used in fabrication, provisions for conduit entrance, access requirements for installation and maintenance, physical size, electrical characteristics, foundation and support details, and weights.

2. Catalog cuts and published material may be included to supplement Shop Drawings.

C. Contract Closeout Submittals:

1. Operation and Maintenance:
   a. Subsequent to final completion, and testing operations, instruct Owner’s authorized representatives in operation, adjustment, and maintenance of electrical plant.
   b. Before Owner’s personnel assume operation of systems, submit operating and maintenance instructions, manuals, parts lists on electrical plant, its component parts, including all equipment which requires, or for which the manufacturer recommends, maintenance in a specified manner. Data sheets shall show complete internal electrical wiring, ratings, and

characteristics, catalog data on components parts whether furnished by equipment manufacturer or others, names, addresses, and telephone numbers of source of supply for parts subject to wear or electrical failure, and description of operating, test, adjustment, and maintenance procedures.

D. Submit the equipment to the Architect for final review.

1.18 ELECTRICAL EQUIPMENT MAINTENANCE MANUALS

A. The Electrical Contractor shall prepare maintenance manuals for the servicing of all equipment installed as a part of the construction contract.

B. The information contained in the manuals shall be grouped in an orderly arrangement under basic categories, i.e., Motors & Controls, Lighting Equipment, etc.

1.19 JOB RECORD INFORMATION

A. Record drawings shall be continuously maintained in the field by the Contractor. Drawings used for this purpose shall be the latest revision and shall be kept neat and clean.

1.20 NAMEPLATES AND TAGS – SEE 260553

A. The following items shall be equipped with tags or nameplates with etched letters:

1. Disconnect switches, fused or unfused; circuit breakers, contactors or relays in separate enclosures.

2. Wall switches controlling outlets, or equipment where the outlets are not located within sight of the controlling switch.

3. Special electrical systems shall be properly identified at junction and pull boxes, terminal cabinets and equipment racks.

4. Label all junction boxes with pen indicating type of system (i.e. Power, Data, etc.), circuit voltage, panel and circuit number and switch leg.

5. Label all data and telephone outlets and patch panels with manufacturer’s labels. Labels per the owner.

1.21 FINAL SUBMITTALS

A. After completion of all electrical work and prior to final inspection, submit the following:

1. Letter addressed to Engineer, stating that Contractor, or superintendent in charge of job, has personally made a complete inspection of the job; that those items found to be defective in material or workmanship or not in conformance with drawings and specifications have been corrected; and that entire electrical job is ready for final observation by Engineer.

2. One copy of the electrical equipment maintenance manual (see 1.15) to be sent direct to Engineer for review, containing the following:
   a. Letter of transmittal, addressed to Engineer, containing a list of suppliers of replacement parts for all electrical equipment used on job.
   b. Panel, switchboard, and control drawings corrected to agree with Engineer's notations.
   c. Catalog cuts of all lighting fixtures, lamps, transformers, starters, special devices, door control system, and all other equipment used on job.
   d. All available maintenance data published.
   e. Wiring diagrams and operating instructions for all systems installed.
   f. Marked-up set of prints showing exact location of all conduits and outlets deviating from original plans. Purchase prints new for this purpose. Prints not required to be bound in maintenance manual.
   g. Signed receipts for all loose items i.e. keys, instructions and guarantee, etc.

3. Refer to Division 01 for Operations and Maintenance Manuals.

1.22 WARRANTY

A. Warranties shall be provided per Division 01. Where not indicated provide minimum 1 year (or standard manufacturers warranty if longer) warranty for all equipment installed on this project. Warranty shall include all labor, site visit, installation costs.

1.23 PAY REQUEST SUBMITTALS

A. In addition to the requirements of other Divisions of the Specifications, provide substantiating data for Architect's review for each pay request

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials and Equipment General Requirements:

1. All items of materials in each category of equipment shall be of one manufacturer.

2. Groups of items having same or similar function shall be by single manufacturer to facilitate maintenance and service.

3. Compatible with space allocated. Modifications necessary to adjust items to space limitations shall be at Contractor's expense.

4. Conform with conditions shown and specified. Coordinate with other trades for best possible assembly of completed Work.

5. Install fully operating without objectionable noise or vibration.

B. Access Doors:

1. Furnish under this Division where shown, required by regulatory agencies, and for access to all concealed electrical items requiring access. Access doors shall be in accordance with requirements of Division 08. Doors in this Division, Division 08, and Division 23 shall be from the same manufacturer for identical appearance and keying. Furnish fire rated doors where required. Deliver access doors for installation under Division 08. Mark each access door to accurately establish its location.

C. Firestopping and Smokestopping: Provide in accordance with Division 07.

1. Provide firestopping where wiring, conduit, or cable tray penetrates fire wall or floor.

2. Provide smokestopping where wiring, conduit, or cable tray penetrates smoke barrier.

2.2 SLEEVES FOR RACEWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel.

1. Minimum Metal Thickness:
   a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side more than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
   b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches (1270 mm) and 1 or more sides equal to, or more than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2.3 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable

1. Basis-of-Design Product: Subject to compliance with requirements, provide comparable product by one of the following:
   a. Advance Products & Systems, Inc.
   b. Calpico, Inc.
   c. Metraflex Co.
   d. Pipeline Seal and Insulator, Inc.

2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.

3. Pressure Plates: Plastic, Carbon steel. Include two for each sealing element.

4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.4 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Follow manufacturer's directions in all cases where manufacturers of articles used furnish directions covering points not shown or specified.

B. Accurately set and level equipment with supports neatly placed and properly fastened. No allowance of any kind will be made for negligence on the part of the Contractor to foresee means of bringing in and installing equipment in position inside the building.

C. Conduit System:

1. Work into complete integrated arrangement with like elements. Make work neat and finished appearing.

2. Run concealed, except where shown otherwise. Where exposed run parallel with walls or structural elements with vertical runs plumb, horizontal runs level; groups racked together neatly with bends parallel and uniformly spaced.

D. Provide hangers, supports, anchors and chases as required for installation of electrical work.

E. Interface with other products:

1. For purposes of clarity and legibility, Drawings are essentially diagrammatic to the extent that many offsets, bends, special fittings, and exact locations of items are not indicated, unless specifically dimensioned. Exact routing of wiring, and locations of outlets, panels, and other items shall be governed by structural conditions or obstructions. Contractor shall make use of data in Contract Documents. In addition, Architect reserves right, at no increase in Contract Sum, to make any reasonable change in location of electrical items exposed at ceilings or on partitions to group them in orderly relationships or to increase their utility. Verify requirements in this regard prior to roughing-in.

2. Take dimensions, location of doors, partitions, and similar features from Architectural Drawings. Verify at the Site under this Division. Consult Architectural Drawings for exact location of outlets, and other items to center with architectural features. Coordinate location of all ceiling mounted items with Division 09.

3.2 FIELD QUALITY CONTROL

A. Test panels and circuits for grounds and shorts with mains disconnected from feeders, branch circuits connected, and circuit breakers closed, all fixtures in place, permanently connected, grounding jumper to neutral lifted, and with all wall switches closed.

3.3 CLEANING

A. Properly prepare work under this Division to be finish painted under Division 01.

3.4 EQUIPMENT IDENTIFICATION

A. Properly identify panelboards, circuit breakers in panelboards, disconnect switches, starters, and other apparatus used for operation or control of circuits, appliances or equipment.

3.5 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Comply with NECA 1.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity

E. Right of Way: Give to piping systems installed at a required slope.

3.6 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

E. Cut sleeves to length for mounting flush with both surfaces of walls.

F. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.

G. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable, unless indicated otherwise.

H. Seal space outside of sleeves with grout for penetrations of concrete and masonry

1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants.".

J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."

3.7 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations

B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.8 FIRESTOPPING

A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

END OF SECTION 26 05 00

SECTION 26 05 19 – LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.
3. Sleeves and sleeve seals for cables.

1.2 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

B. NBR: Acrylonitrile-butadiene rubber.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Qualification Data: For testing agency.

C. Field quality-control test reports.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

1.5 COORDINATION

A. Set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Alcan Products Corporation; Alcan Cable Division.
2. American Insulated Wire Corp.; a Leviton Company.
3. General Cable Corporation.
4. Senator Wire & Cable Company.
5. Southwire Company.

C. Copper Conductors: Comply with NEMA WC 70. Minimum size - No. 12 AWG. Stranded.

D. Conductor Insulation: Comply with NEMA WC 70. Drawings are based on using THHN-THWN copper cables. Contractor shall increase conduit size for any other insulation or if aluminum used.

E. Ground Wire: Proved THWN ground wire in all circuits, sized per code. Raceway shall not be used as ground.

F. Control and Low Voltage Cable: Cable shall be as recommended by manufacturer. Contractor shall coordinate location of plenums in building with all other trades. Provide plenum rated cable whenever cable passes through a plenum for the entire length.

2.2 CONNECTORS AND SPLICES

A. Splices and Terminations

1. 600 Volt
    a. Splices: Solderless type only. Preinsulated "twist-on" type permitted on solid conductor size number 10 and smaller. Hydraulic compression long barrel type with application preformed insulated cover, heat shrinkable tubing or plastic insulated tape for all stranded conductors. For stranded conductors provide terminations designed for use with stranded conductors.
    b. Terminations: 250 kcmil and above - two hole long barrel compression lugs. Below 250 kcmil - single hole compression lug. Conductors No. 12 and smaller: provide eye or forked tongue compression lugs at bolted or screw connections - no lugs required for compression style terminal blocks.

c. Cable Ties: Nylon or accepted, locking type. Use a torque limiting tool for installation of ties.

2. Control Cable Splices and Terminations
   a. Splices: Preinsulated crimp pigtail or butt splice connectors.
   b. Terminations: Locking spade, insulated, compression lugs.

B. Splices and Terminations When Aluminum Wire Permitted (See Part 3)

1. Burndy Hy-Lug or Hy-Plug on both ends.

C. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.

2. Hubbell Power Systems, Inc.

3. O-Z/Gedney; EGS Electrical Group LLC.

4. 3M; Electrical Products Division.

5. Tyco Electronics Corp.

D. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Branch Circuits: Copper. Stranded.

B. Minimum wire size: No. 12 AWG.

C. All raceways sized based on THHN/THWN. Contractor shall increase conduit size when alternate insulation used.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Type THHN-THWN, single conductors in raceway. All raceways sized based on THHN/THWN. Contractor shall increase raceway size when alternate insulation used.

B. Branch Circuits: Type THHN-THWN, single conductors in raceway.

C. Class 2 Control and Low Voltage Circuits: Type THHN-THWN, in raceway, or as required by manufacturer. Plenum rated where required. Cable shall not be installed in slab or under ground. All circuits shall be installed in raceway when installed in walls and non-accessible spaces.

3.3 BRANCH WIRING

A. General: Complete system of conduit required to all light outlets, receptacles, switches, etc. as shown. Conduit size as shown on drawings, except where no size is shown, conduit shall be sized per National Electrical Code. No conduit shall carry more than 8 conductors. All exposed switches, receptacles or outlet boxes for other purposes, install die cast boxes, except where specifically noted otherwise. Feeder cables shall have each phase identified according to the established code.

B. Coding: Branch circuit color code shall be: For 120/208 V. Black – Phase A, Red – Phase B, Blue – Phase C, White – Neutral, Green – Ground. For 277/480V. Brown (A), Orange (B), Yellow (C), and Gray neutral. Where colors are not available (No. 4 and larger both on the wire. Phase and neutral wires shall appear in the same position and rotation at all appearances.

3.4 EQUIPMENT WIRING

A. General: Wiring connections for power and control for all equipment shall be complete including disconnect switches and controls unless otherwise specified or noted on drawings.

B. Control wiring for mechanical systems installed under this section of specifications shall be in accordance with mechanical drawings and specifications.

3.5 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in raceway in finished walls, ceilings, and floors, unless otherwise indicated.

B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Exposed cables not permitted.

E. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems."

F. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."

3.6 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches (300 mm) of slack.

3.7 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors, and branch conductors for compliance with requirements.
   a. Megger Test

2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

3. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each splice in cables and conductors No. 2 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner.
   a. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
   b. Record of Infrared Scanning: Prepare a certified report that identifies splices checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

C. Test Reports: Prepare a written report to record the following:

1. Test procedures used.

2. Test results that comply with requirements.

3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

D. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 26 05 19

SECTION 26 05 26 – GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes methods and materials for grounding.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Operation and Maintenance Data: For grounding products used.

1.3 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association to supervise on-site testing specified in Part 3.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.

2. Stranded Conductors: ASTM B 8.

3. Tinned Conductors: ASTM B 33.

4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.

5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.

6. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

2.2 CONNECTORS

A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.

C. Insulated Ground Conductors: Per 260519.

D. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install stranded copper conductor.

B. Ground Conductors: Green colored insulation. Provide in all raceways with 120V and above circuits.

C. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors or exothermic weld where required by code authority.

2. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

1. Feeders and branch circuits.

2. Lighting circuits.

3. Receptacle circuits.

4. Single-phase motor and appliance branch circuits.

5. Three-phase motor and appliance branch circuits.

6. Flexible raceway runs.

7. Armored and metal-clad cable runs.

8. Computer and Rack-Mounted Electronic Equipment Circuits: Install insulated equipment grounding conductor in branch-circuit runs from equipment-area power panels and power-distribution units.

C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

3.3 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.

2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.

C. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners.

D. Consult with code authority and comply with all code authority requirements.

END OF SECTION 26 05 26

SECTION 26 05 29 – HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Hangers and supports for electrical equipment and systems.

1.2 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. IMC: Intermediate metal conduit.

C. RMC: Rigid metal conduit.

D. IBC: International Building Code

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

E. All supports shall comply with IBC, Washington Seismic Zone, Building Use Group III.

1.4 SUBMITTALS

A. Product Data: For the following:

1. Steel slotted support systems.

2. Nonmetallic slotted support systems.

B. Shop Drawings: Show fabrication and installation details and include calculations for the following:

1. Trapeze hangers. Include Product Data for components.

2. Steel slotted channel systems. Include Product Data for components.

3. Nonmetallic slotted channel systems. Include Product Data for components.

4. Equipment supports.

C. Welding certificates.

1.5 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Comply with NFPA 70.

1.6 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Allied Tube & Conduit.
   b. Cooper B-Line, Inc.; a division of Cooper Industries.
   c. ERICO International Corporation.
   d. GS Metals Corp.
   e. Thomas & Betts Corporation.
   f. Unistrut; Tyco International, Ltd.
   g. Wesanco, Inc.

2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.

3. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.

4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.

5. Channel Dimensions: Selected for applicable load criteria.

B. Nonmetallic Slotted Support Systems: Not permitted.

C. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

D. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

E. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

F. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

G. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      1) Hilti Inc.
      2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
      3) MKT Fastening, LLC.
      4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.

2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      1) Cooper B-Line, Inc.; a division of Cooper Industries.
      2) Empire Tool and Manufacturing Co., Inc.
      3) Hilti Inc.
      4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
      5) MKT Fastening, LLC.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.

4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.

5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.

6. Toggle Bolts: All-steel springhead type.

7. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to the supports.

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.

2. To New Concrete: Bolt to concrete inserts.

3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.

4. To Existing Concrete: Expansion anchor fasteners.

5. Retain first subparagraph below if powder-actuated devices are allowed. Consider deleting if Project contains both lightweight and standard-weight concrete or more than one thickness of concrete slab.

6. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.

7. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.

8. To Light Steel: Sheet metal screws.

9. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for site-fabricated metal supports.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

B. Touchup: Comply with requirements in Division 09 for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 26 05 29

SECTION 26 05 33 – RACEWAY AND BOXES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. ENT: Electrical nonmetallic tubing.

C. EPDM: Ethylene-propylene-diene terpolymer rubber.

D. FMC: Flexible metal conduit.

E. IMC: Intermediate metal conduit.

F. LFMC: Liquidtight flexible metal conduit.

G. LFNC: Liquidtight flexible nonmetallic conduit.

H. NBR: Acrylonitrile-butadiene rubber.

I. RNC: Rigid nonmetallic conduit.

J. RGS: Rigid galvanized steel

K. PVC: Polyvinyl Chloride

L. MC: Metal Clad

1.4 SUBMITTALS

A. Product Data: For wireways and fittings, hinged-cover enclosures, and cabinets.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METALLIC CONDUIT AND TUBING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.
2. Alflex Inc.
3. Allied Tube & Conduit; a Tyco International Ltd. Co.
4. Anamet Electrical, Inc.; Anaconda Metal Hose.
5. Electri-Flex Co.
6. Manhattan/CDT/Cole-Flex.
7. Maverick Tube Corporation.
8. O-Z Gedney; a unit of General Signal.
9. Wheatland Tube Company.

B. Rigid Steel Conduit: ANSI C80.1.

C. Aluminum Rigid Conduit: Not permitted.

D. IMC: ANSI C80.6.

E. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.

1. Comply with NEMA RN 1.
2. Coating Thickness: 0.040 inch (1 mm), minimum.

F. EMT: ANSI C80.3. Hot dipped galvanized inside and outside.

G. FMC: Steel

H. LFMC: Flexible steel conduit with PVC jacket.

I. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

1. Coordinate first subparagraph below with Drawings.

2. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.

3. Fittings for EMT: Steel, compression only for wet/damp locations. Provide set screw type for interior and dry areas.

4. Coating for Fittings for PVC-Coated Conduit: Minimum thickness, 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.

J. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

2.2 NONMETALLIC CONDUIT AND TUBING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.

2. Anamet Electrical, Inc.; Anaconda Metal Hose.

3. Arnco Corporation.

4. CANTEX Inc.

5. CertainTeed Corp.; Pipe & Plastics Group.

6. Condux International, Inc.

7. ElecSYS, Inc.

8. Electri-Flex Co.

9. Lamson & Sessions; Carlon Electrical Products.

10. Manhattan/CDT/Cole-Flex.

11. RACO; a Hubbell Company.

12. Thomas & Betts Corporation.

B. ENT: NEMA TC 13. Not permitted except for fiber optic cable innerduct in raceway.

C. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated as PVC 80. Incoming telephone and TV circuits shall be PVC–80.

D. LFNC: Not permitted.

E. Fittings for ENT and RNC: NEMA TC 3; match to conduit or tubing type and material.

F. Fittings for LFNC: Not permitted.

2.3 MC Cable

A. Conductors are made from class B copper. Sizes 12 awg and 10 awg may be either solid or stranded. The conductors are constructed with THHN/THWN or XHHW-2 insulation rated for 90oC dry at 600 volts max. Copper grounding conductors are cabled with the phase conductors. In circuit applications, the grounding conductor size is based on the rating of the over-current device. An additional grounding conductor is provided for isolated or redundant grounding. Aninterlocked aluminum armor is helically formed around the conductor assembly and is 45% lighter than steel MC cable.

2.4 METAL WIREWAYS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper B-Line, Inc.

2. Hoffman.

3. Square D; Schneider Electric.

B. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1 or 3R when outside, unless otherwise indicated.

C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

D. Wireway Covers: Hinged type.

E. Finish: Manufacturer's standard enamel finish.

2.5 BOXES, ENCLOSURES, AND CABINETS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.

2. EGS/Appleton Electric.

3. Erickson Electrical Equipment Company.

4. Hoffman.

5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.

6. O-Z/Gedney; a unit of General Signal.

7. RACO; a Hubbell Company.

8. Robroy Industries, Inc.; Enclosure Division.

9. Scott Fetzer Co.; Adalet Division.

10. Spring City Electrical Manufacturing Company.

11. Thomas & Betts Corporation.

12. Walker Systems, Inc.; Wiremold Company (The).

13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.

B. Sheet Metal Outlet and Device Boxes: NEMA OS 1. Minimum size: 4-inch by 4-inch by 1 ½-inch. Voice/data boxes minimum 2 1/8-inch deep.

C. Except in unfinished areas such as mechanical and electrical rooms, outlet, junction and pull boxes in new construction shall be flush mounted to the finished surface. Provide raised trim rings as required to insure device will be flush with finished surface.

D. Outlet, junction and pull boxes in existing construction shall be concealed by cutting in to existing partition and fishing flex from above suspended ceilings. Where outlet, junction and pull boxes cannot be concealed, use of surface mounted outlet, junction and pull boxes and associated raceway system must be reviewed with the District prior to use. (Note: The district expects surface mounted raceway will be required in many locations in existing classrooms and hallways. It will be the designer’s responsibility to determine where surface raceway is appropriate and advise the District accordingly. Issue of cost/benefit will need to be reviewed.) Size J boxes so no extension boxes are needed

E. Provide raised trim rings as required to insure devices will be flush with finished surface.

F. Cast-Metal Outlet and Device Boxes: NEMA FB 1, aluminum, Type FD, with gasketed cover.

G. Nonmetallic Outlet and Device Boxes: Not permitted.

H. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

I. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, cast aluminum with gasketed cover.

J. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

K. Cabinets:

1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.

2. Hinged door in front cover with flush latch and concealed hinge.

3. Key latch to match panelboards.

4. Metal barriers to separate wiring of different systems and voltage.

5. Accessory feet where required for freestanding equipment.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Comply with the following indoor applications, unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.

2. Exposed and Subject to Severe Physical Damage: Rigid steel conduit.

3. Concealed in Ceilings and Interior Walls and Partitions: EMT, MC Cable, or Flexible Metallic Conduit. All circuit homeruns to panels shall be EMT.

4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.

5. Damp or Wet Locations: Rigid steel conduit.

6. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, stainless steel in damp or wet locations.

B. Minimum Raceway Size: Homeruns minimum 3/4-inch trade size. Other raceways may be ½-inch.

C. Communications (Telephone and Data): Shall be EMT in walls & overhead. 1” minimum. Underground is not permitted.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.

E. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.

F. Do not install aluminum conduits in contact with concrete.

3.2 INSTALLATION

A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

B. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Support raceways as specified in Division 26 Section "Hangers, Supports and Fasteners."

E. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.

F. Conceal EMT within finished walls, ceilings, and floors, unless otherwise indicated.

G. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

H. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

I. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire.

J. Flexible Conduit Connections: Use maximum of 72 inches (1830 mm) of flexible conduit for recessed and semirecessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations subject to severe physical damage.

2. Use LFMC in damp or wet locations not subject to severe physical damage.

K. Stagger back to back outlets to acoustic wall. Similarly stagger back to back outlets where sound transmission is an issue in non-rated construction

END OF SECTION 26 05 33

SECTION 26 05 53 – IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Identification for raceway and metal-clad cable.
2. Identification for conductors and communication and control cable.
3. Warning labels and signs.
4. Instruction signs.
5. Equipment identification labels.
6. Miscellaneous identification products.

1.2 SUBMITTALS

A. Product Data: For each electrical identification product indicated.

B. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.

1.3 QUALITY ASSURANCE

A. Comply with ANSI A13.1 and ANSI C2.

B. Comply with NFPA 70.

C. Comply with 29 CFR 1910.145.

1.4 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in the Contract Documents, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual, and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.

B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

C. Coordinate installation of identifying devices with location of access panels and doors.

D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 RACEWAY AND METAL-CLAD CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

B. Color for Printed Legend:

1. Power Circuits: White letters on a blue field. – 120

2. Power Circuits White letters on black for 277/480

3. Emergency Power: White on dark orange/red.

4. Fire Alarm: White on red.

5. Legend: Indicate system or service and voltage, if applicable.

C. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

D. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; 2 inches (50 mm) wide; compounded for outdoor use.

2.2 CONDUCTOR AND COMMUNICATION- AND CONTROL-CABLE IDENTIFICATION MATERIALS

A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils (0.08 mm) thick by 1 to 2 inches (25 to 50 mm) wide.

B. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

C. Aluminum Wraparound Marker Labels: Cut from 0.014-inch- (0.35-mm-) thick aluminum sheet, with stamped, embossed, or scribed legend, and fitted with tabs and matching slots for permanently securing around wire or cable jacket or around groups of conductors.

D. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch (50 by 50 by 1.3 mm), with stamped legend, punched for use with self-locking nylon tie fastener.

E. Write-On Tags: Polyester tag, 0.015 inch (0.38 mm) thick, with corrosion-resistant grommet and polyester or nylon tie for attachment to conductor or cable.

1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

2.3 UNDERGROUND-LINE WARNING TAPE

A. Description: Permanent, bright-colored, continuous-printed, polyethylene tape.

1. Not less than 6 inches (150 mm) wide by 4 mils (0.102 mm) thick.

2. Compounded for permanent direct-burial service.

3. Embedded continuous metallic strip or core.

4. Printed legend shall indicate type of underground line.

2.4 WARNING LABELS AND SIGNS

A. Comply with NFPA 70 and 29 CFR 1910.145.

B. Self-Adhesive Warning Labels: Factory printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment, unless otherwise indicated.

C. Baked-Enamel Warning Signs: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application. 1/4-inch (6.4-mm) grommets in corners for mounting. Nominal size, 7 by 10 inches (180 by 250 mm).

D. Metal-Backed, Butyrate Warning Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch (1-mm) galvanized-steel backing; and with colors, legend, and size required for application. 1/4-inch (6.4-mm) grommets in corners for mounting. Nominal size, 10 by 14 inches (250 by 360 mm).

E. Warning label and sign shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."

2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES (915 MM) or 42 INCHES (1067 MM)."

2.5 INSTRUCTION SIGNS

A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch (1.6 mm) thick for signs up to 20 sq. in. (129 sq. cm) and 1/8 inch (3.2 mm) thick for larger sizes.

1. Engraved legend with black letters on white face.

2. Punched or drilled for mechanical fasteners.

3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.6 EQUIPMENT IDENTIFICATION LABELS

A. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm). Overlay shall provide a weatherproof and ultraviolet-resistant seal for label.

B. Color scheme shall be white letters on blue for 120/208, white letters on black for 277/480, and white letters on red for emergency.

2.7 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Cable Ties: Fungus-inert, self-extinguishing, 1-piece, self-locking, Type 6/6 nylon cable ties.

1. Minimum Width: 3/16 inch (5 mm).

2. Tensile Strength: 50 lb (22.6 kg), minimum.

3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).

4. Color: Black, except where used for color-coding.

B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

C. Panels and Equipment

1. Power 120 Volt: White letters on a blue field. – 120

2. Power Circuits 277 volt White letters on a black field - 277

3. Emergency Power: Blue on dark orange/red.– 120

4. Emergency Power: Black on dark orange/red - 277

5. Fire Alarm: White on red.

6. Legend: Indicate system or service and voltage, if applicable.

PART 3 - EXECUTION

3.1 APPLICATION

A. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A: Identify with orange self-adhesive vinyl label or snap-around label or self-adhesive vinyl tape applied in bands.

B. Accessible Raceways and Cables of Auxiliary Systems: Identify the following systems with color-coded, self-adhesive vinyl tape applied in bands or snap-around, color-coding bands: Color per J-Box label above.

C. Power-Circuit Conductor Identification: For primary and secondary conductors No. 4 AWG and larger in vaults, pull and junction boxes, manholes, and handholes use color-coding conductor tape. Identify source and circuit number of each set of conductors. For single conductor cables, identify phase in addition to the above.

D. Branch-Circuit Conductor Identification: Where there are conductors for more than three branch circuits in same junction or pull box, use aluminum wraparound marker labels. Identify each ungrounded conductor according to source and circuit number.

E. Conductors to Be Extended in the Future: Attach marker tape to conductors and list source and circuit number.

F. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, signal, sound, intercommunications, voice, and data connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.

2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.

3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and Operation and Maintenance Manual.

G. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Comply with 29 CFR 1910.145 and apply self-adhesive warning labels. Identify system voltage with black letters on an orange background. Apply to exterior of door, cover, or other access.

1. Equipment with Multiple Power or Control Sources: Apply to door or cover of equipment including, but not limited to, the following:
   a. Power transfer switches.
   b. Controls with external control power connections.

2. Equipment Requiring Workspace Clearance According to NFPA 70: Unless otherwise indicated, apply to door or cover of equipment but not on flush panelboards and similar equipment in finished spaces.

H. Instruction Signs:

1. Operating Instructions: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.

2. Emergency Operating Instructions: Install instruction signs with white legend on a red background with minimum 3/8-inch- (10-mm-) high letters for emergency instructions at equipment used for power transfer and load shedding.

I. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:
   a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where 2 lines of text are required, use labels 2 inches (50 mm) high.
   b. Outdoor Equipment: Engraved, laminated acrylic or melamine label. Stenciled legend 4 inches (100 mm) high.
   c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.

2. Equipment to Be Labeled:
   a. Panelboards, electrical cabinets, and enclosures.
   b. Access doors and panels for concealed electrical items.
   c. Electrical switchboards.
   d. Emergency system boxes and enclosures.
   e. Motor-control.
   f. Disconnect switches.
   g. Enclosed circuit breakers.
   h. Motor starters.
   i. Push-button stations.
   j. Contactors.
   k. Voice and data cable terminal equipment.
   l. Master clock and program equipment.
   m. Intercommunication and call system master and staff stations.
   n. Television/audio components, racks, and controls.
   o. Fire-alarm control panel and annunciators.
   p. Terminals, racks, and patch panels for voice and data communication and for signal and control functions.
   q. Junction boxes: System, voltage and circuit with black pen.

3.2 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Apply identification devices to surfaces that require finish after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

E. Attach nonadhesive signs and plastic labels with screws and auxiliary hardware appropriate to the location and substrate.

F. System Identification Color Banding for Raceways and Cables: Each color band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.

G. Color-Coding for Phase and Voltage Level Identification, 600 V and Less: Use the colors listed below for ungrounded conductors.

1. Color shall be factory applied.

2. Colors for 208/120-V Circuits:
   a. Phase A: Black.
   b. Phase B: Red.
   c. Phase C: Blue.
   d. Neutral: White

3. Colors for 480/277-V Circuits:
   a. Phase A: Brown.
   b. Phase B: Orange.
   c. Phase C: Yellow.
   d. Neutral: Gray

4. If field-applied color-coding is permitted, retain subparagraph below.

5. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

H. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.

I. Painted Identification: Prepare surface and apply paint according to Division 09 painting Sections.

END OF SECTION 26 05 53

SECTION 26 27 26 – WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Specification-grade receptacles
2. GFCI receptacles, 125 V, 20 A.
3. Controlled Receptacles
4. Toggle switches, 120/277 V

1.3 DEFINITIONS

A. AFCI: Arc-fault circuit interrupter.

B. EMI: Electromagnetic interference.

C. GFCI: Ground-fault circuit interrupter.

D. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

E. SPD: Surge protective device.

1.4 SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing-label warnings and instruction manuals that include labeling conditions.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and one source.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:

1. Cooper Wiring Devices; a division of Cooper Industries, Inc. (Cooper).

2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).

3. Leviton Mfg. Company Inc. (Leviton).

4. Pass & Seymour/Legrand; Wiring Devices & Accessories (Pass & Seymour).

2.2 GENERAL WIRING-DEVICE REQUIREMENTS

A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, be tamperproof, and marked for intended location and use.

B. Comply with NFPA 70.

C. RoHS compliant.

D. Comply with NEMA WD 1.

E. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:

1. Connectors shall comply with UL 2459 and shall be made with stranded building wire.

2. Devices shall comply with requirements in this Section.

F. Devices for Owner-Furnished Equipment:

1. Receptacles: Match plug configurations.

2. Cord and Plug Sets: Match equipment requirements.

G. Device Color:

1. Wiring Devices Connected to Normal Power System: White unless otherwise indicated or required by NFPA 70 or device listing.

2. Controlled receptacles: Green

3. Wiring Devices Connected to Essential Electrical System: same as above with emergency plate

H. Wall Plate Color: Stainless Steel 302.

I. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.3 STANDARD-GRADE RECEPTACLES, 125 V, 20 A

A. Duplex Receptacles, 125 V, 20 A. Leviton 5362 or equal. All receptacles shall be tamper resistant.

1. Description: Two pole, three wire, and self-grounding.

2. Configuration: NEMA WD 6, Configuration 5-20R.

3. Standards: Comply with UL 498 and FS W-C-596.

B. Controlled receptacles: Same as above except green color and marked with “Controlled” and controlled symbol

1. Leviton 5362-S2N
   a. Split wire in locations shown on drawings

2.4 GFCI RECEPTACLES, 125 V, 20 A

A. Duplex GFCI Receptacles, 125 V, 20 A. Legrand 2097 or equal. All receptacles shall be tamper resistant.

1. Description: Integral GFCI with "Test" and "Reset" buttons and LED indicator light. Two pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle.

2. Configuration: NEMA WD 6, Configuration 5-20R.

3. Standards: Comply with UL 498, UL 943 Class A, and FS W-C-596.

4. No feed through permitted. All to be individual GFI

2.5 SWITCHES

A. Comply with NEMA WD 1 and UL 20.

B. Switches, 120/277 V, 20 A:

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Cooper; 2221 (single pole), 2222 (two pole), 2223 (three way), 2224 (four way).
   b. Hubbell; CS1221 (single pole), CS1222 (two pole), CS1223 (three way), CS1224 (four way).
   c. Leviton; 1221-2 (single pole), 1222-2 (two pole), 1223-2 (three way), 1224-2 (four way).
   d. Legrand; 20AC1 (single pole), 20AC2 (two pole), 20AC3 (three way), 20AC4 (four way).

2.6 WALL PLATES

A. Single Source: Obtain wall plates from same manufacturer of wiring devices.

B. Single and combination types shall match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.

2. Material for Finished Spaces: 0.035-inch- (1-mm-) thick, satin-finished, Type 302 stainless steel

3. Material for Unfinished Spaces: Galvanized steel. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.

PART 3 - EXECUTION

3.1 INSTALLATION

A. NECA 1 referenced in first paragraph below includes device mounting-height requirements. See "Mounting Heights and Locations" Article in the Evaluations for device mounting heights in NECA 1.

B. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.

C. See "Device Configurations, Ratings, and Grades" Article in the Evaluations for timing and sequencing of construction to help avoid contamination of devices during construction.

D. Coordination with Other Trades:

1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes, and do not cut holes for boxes with routers that are guided by riding against outside of boxes.

2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.

3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.

4. Install wiring devices after all wall preparation, including painting, is complete.

E. Conductors:

1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.

2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.

3. The length of free conductors at outlets for devices shall comply with NFPA 70, Article 300, without pigtails.

4. Existing Conductors:
   a. Cut back and pigtail, or replace all damaged conductors.
   b. Straighten conductors that remain and remove corrosion and foreign matter.
   c. Pigtailing existing conductors is permitted, provided the outlet box is large enough.

F. Device Installation:

1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.

2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.

3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.

4. Connect devices to branch circuits using pigtails that are not less than 6 inches (152 mm) in length.

5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.

6. Use a torque screwdriver when a torque is recommended or required by manufacturer.

7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.

8. Tighten unused terminal screws on the device.

9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

G. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

I. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

3.2 IDENTIFICATION

A. Comply with Section 260553 "Identification for Electrical Systems."

B. Identify each receptacle with panelboard identification and circuit number in box.

3.3 FIELD QUALITY CONTROL

A. Test Instrument for Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.

B. Tests for Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.

2. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.

3. Using the test plug, verify that the device and its outlet box are securely mounted.

4. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault-current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

C. Wiring device will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

END OF SECTION 26 27 26

SECTION 26 51 00 – INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid-state luminaires that use LED technology.

2. Lighting fixture supports.

1.2 DEFINITIONS

A. CCT: Correlated color temperature.

B. CRI: Color Rendering Index.

C. Fixture: See "Luminaire."

D. IP: International Protection or Ingress Protection Rating.

E. LED: Light-emitting diode.

F. Lumen: Measured output of lamp and luminaire, or both.

G. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Arrange in order of luminaire designation.

2. Include data on features, accessories, and finishes.

3. Include physical description and dimensions of luminaires.

4. Include emergency lighting units, including batteries and chargers.

5. Include life, output (lumens, CCT, and CRI), and energy efficiency data.

6. Photometric data and adjustment factors based on laboratory tests, complying with IESNA Lighting Measurements Testing and Calculation Guides, of each lighting fixture type. The adjustment factors shall be for lamps and accessories identical to those indicated for the lighting fixture as applied in this Project, IES LM-79 and IES LM-80.

a. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.
b. Testing Agency Certified Data: For indicated luminaires, photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing laboratory providing photometric data for luminaires.

B. Seismic Qualification Certificates: For luminaires, 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.

C. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

D. Product Certificates: For each type of luminaire.

E. Product Test Reports: For each luminaire, for tests performed by a qualified testing agency.

F. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.

1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

1.6 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications: Luminaire manufacturer's laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.

B. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7, accredited under the NVLAP for Energy Efficient Lighting Products, and complying with the applicable IES testing standards.

C. Provide luminaires from a single manufacturer for each luminaire type.

D. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.8 TEST REPORTS

A. LED Luminaire IES LM-79: Test Report Submit test report on manufacturer's standard production model luminaire. Include all applicable and required data as outlined under "14.0 Test Report"

B. LED Light Source IES LM-80 Test Report: Submit report on manufacturer's standard production LED light source (package, array, or module). Include all applicable and required data as outlined under

C. LED Light Source IES TM21 Test Report: Submit test report on manufacturer's standard production LED light source (package, array or module). Include all applicable and required data, as well as required interpolation information as outlined in IES TM-21.

1.9 LUMINAIRE USEFUL LIFE CERTIFICATE

A. Submit certification from the manufacturer indicating the expected useful life of the luminaires provided. The useful life must be directly correlated from the IES LM-80 test data using procedures outlined in IES TM-21. Thermal properties of the specific luminaire and local ambient operating temperature and conditions must be taken into consideration

1.10 WARRANTY

A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.

B. Verify available warranties and warranty periods.

C. Warranty Period: Minimum Five year(s) from date of Substantial Completion unless manufacturers standard warranty is longer

PART 2 - PRODUCTS

2.1 LIGHT FIXTURES. Refer to Lighting Fixture Schedule on drawings.

2.2 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Luminaires shall withstand the effects of earthquake motions determined according to ASCE/SEI 7

B. Seismic Performance: Luminaires and lamps shall be labeled vibration and shock resistant.

1. The term "withstand" means "the luminaire will remain in place without separation of any parts when subjected to the seismic forces specified and the luminaire will be fully operational during and after the seismic event."

2.3 LUMINAIRE 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.

B. NRTL Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by an NRTL.

C. Recessed Fixtures: Comply with NEMA LE 4.

D. Bulb shape complying with ANSI C79.1.

E. Lamp base complying with ANSI C81.61

F. CRI of minimum 80 unless noted. CCT of 3500 K unless noted

G. Minimum Rated lamp life of 50,000 hours.

H. Lamps dimmable from 100 percent to 0 percent of maximum light output.

I. Internal driver.

J. Nominal Operating Voltage: Per Drawings

1. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless otherwise indicated.

K. Housings:

1. Extruded-aluminum housing and heat sink.

2. Custom color per architect from provided paint chip

2.4 MATERIALS

A. Metal Parts:

1. Free of burrs and sharp corners and edges.

2. Sheet metal components shall be steel unless otherwise indicated.

3. Form and support to prevent warping and sagging.

B. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

C. Diffusers and Globes: Per drawings

1. Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

2. Glass: Annealed crystal glass unless otherwise indicated.

3. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless otherwise indicated.

D. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.

1. Label shall include the following lamp characteristics:
   a. "USE ONLY" and include specific lamp type.
   b. Lamp diameter, shape, size, wattage, and coating.
   c. CCT and CRI for all luminaires.

2.5 LED POWER SUPPLIES/DRIVERS

A. UL 8750 LED power supplies (drivers) must be electronic, UL Class 1 , constant-current type and comply with the following requirements:

B. Output power (watts) and ouput current (mA) as shown in luminaire schedule for each luminaire type to meet minimum luminaire efficacy (LE) value provided.

C. Power Factor (PF) greater than or equal to .90.

D. Total Harmonic Distortion (THD) of less than 20%.

E. Class A sound rating.

F. Operable at input voltage of 120-277 volts at 60 hertz.

G. Minimum 5 year manufacturer's warranty.

H. RoHS compliant.

I. Integral thermal protection that reduces output power if case temperature exceeds 185 degrees F 85 degrees C

2.6 METAL FINISHES

A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.7 LUMINAIRE FIXTURE SUPPORT COMPONENTS

A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

B. Single-Stem Hangers: 1/2-inch (13-mm) steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.

C. Wires: ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm)

D. Rod Hangers: 3/16-inch (5-mm) minimum diameter, cadmium-plated, threaded steel rod.

E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

2.8 LIGHTING CONTROLS

A. Wattstopper DLM system or equal. Provide room controllers, plug load controllers, digital switches, and occupancy sensors as indicated on plans.

B. Circuitry: As required by manufacturer. Plenum rated if installed within an air plenum.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before fixture installation. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with NECA 1.

B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.

C. Install lamps in each luminaire.

D. Supports:

1. Sized and rated for luminaire weight.

2. Able to maintain luminaire position after cleaning and relamping.

3. Provide support for luminaire without causing deflection of ceiling or wall.

4. Luminaire mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and vertical force of 400 percent of luminaire weight.

E. Flush-Mounted Luminaire Support:

1. Secured to outlet box.

2. Attached to ceiling structural members at four points equally spaced around circumference of luminaire.

3. Trim ring flush with finished surface.

F. Ceiling-Mounted Luminaire Support:

1. Ceiling mount with two 5/32-inch- (4-mm-) diameter aircraft cable supports connected to structur above ceiling

2. Ceiling mount with pendant mount with minimum 5/32-inch- (4-mm-)]diameter aircraft cable supports.

3. Ceiling mount with hook mount.

G. Suspended Luminaire Support:

1. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swinging.

2. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.

3. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and tubing or rod wire support for suspension for each unit length of luminaire chassis, including one at each end.

4. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.

H. Ceiling-Grid-Mounted Luminaires:

1. Secure to any required outlet box.

2. Retain first subparagraph below to require ceiling grid to be connected to building structure at four corners of luminaire opening.

3. Secure luminaire to the luminaire opening using approved fasteners in a minimum of four locations, spaced near corners of luminaire.

4. Retain subparagraph below if ceiling grid is not connected to building structure at four corners of the luminaire opening.

5. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.

I. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

3.3 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.

2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.

B. Luminaire will be considered defective if it does not pass operation tests and inspections.

C. Prepare test and inspection reports.

END OF SECTION 26 51 00

SECTION 27 15 00 – COMMUNICATIONS, TELEPHONE AND DATA CABLING SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Provide all materials and labor for the installation of a communications (telephone and data) cabling and termination system. This section includes Communications cabling, termination, and administration equipment and installation requirements for the specified System

1.2 REFERENCES

A. General:

1. National Electrical Code (NEC)
2. National Electrical Safety Code (NESC)
3. Washington Industrial Safety and Health Act (WISHA)
4. Occupational Safety and Health Act (OSHA)
5. International Building Code (IBC)

B. Communications:

1. ANSI/TIA/EIA - 455: Fiber Optic Test Standards
2. ANSI/TIA/EIA - 568-B: Commercial Building Telecommunications Cabling Standard
3. ANSI/TIA/EIA - 569: Commercial Building Standard for Telecommunication Pathways and Spaces
4. ANSI/TIA/EIA - 606: The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
5. ANSI/TIA/EIA - 607: Commercial Building Grounding and Bonding Requirements for Telecommunications
6. ANSI/TIA/EIA -TSB67: Transmission Performance Specifications for Field Testing of Unshielded Twisted Pair Cabling Systems
7. ANSI/TIA/EIA -TSB75: Additional Horizontal Cabling Practices for Open Offices
8. NECA/BICSI 568: Standard for Installing Commercial Building Telecommunications Systems
9. IEEE 802.3 (series): Local Area Network Ethernet Standard, including the IEEE 802.3z Gigabit Ethernet Standard

10. ISO/IEC IS 11801: Generic Cabling for Customer Premises

11. BICSI: ITSIM Information Transport Systems Installation Manual

12. BICSI: BICSI Telecommunications Distribution Methods Manual (TDMM)

1.3 DEFINITIONS

A. Voice, Telephone, and Phone are used throughout this section to refer to the telephone.

1.4 SYSTEM DESCRIPTION

A. Furnish, install, test and place into satisfactory and successful operation all equipment, materials, devices, and necessary appurtenances to provide a complete ANSI/TIA/EIA, NECA/NEIS and ISO/IEC compliant communications Structured Cabling System as hereinafter specified and/or shown on the Contract Documents. The system is intended to be capable of integrating voice and data signals onto a common media, and shall be tested for and be capable of 10 Gigabit Ethernet operation for copper cable as specified in IEEE 802.3 and 10 Gigabit Ethernet operation for fiber optic cable.

B. The work shall include all materials, equipment and apparatus not specifically mentioned herein or noted on the plans but which are necessary to make a complete working ANSI/TIA/EIA and ISO/IEC compliant cabling system.

1.5 SUBMITTAL INFORMATION

The Contractor shall apply Contractor’s stamp, sign, or initial certifying that review, verification of required Products, and coordination of information is in accordance with the requirements of the work and Contract Documents.

Any deviations from the Contract Documents or specified product data shall be clearly noted, and must be reviewed by owner and approved by the Engineer prior to start of construction.

If the deviation is not reviewed by owner and approved by the Engineer it remains the Contractor’s responsibility to provide what is required in the Contract Documents”.

A. Product Data Submittals: Provide submittal information for review before materials are delivered to the job site. Combine product submittals for all products and submit together as a single submittal.

1. Provide standard manufacturer’s cut sheets and the operating and maintenance (O&M) instructions at the time of submittal review for each device in the system, regardless of whether it is submitted as specified or as an approved equal. These instructions shall detail how to install and service the equipment and shall include information necessary for rough-in and preparation of the building facilities to receive the materials.

B. Quality Control Submittals: Provide submittal information for review as follows:

1. In accordance with the QUALITY ASSURANCE requirements below, submit the contractor-qualifications documentation
    a. Documentation indicating that the Contractor will have only manufacturer-trained and manufacturer-certified employees perform installation, testing, and firestopping work, as detailed below.
    b. Documentation demonstrating that the Contractor employs a minimum of one Registered Communications Distribution Designer (RCDD) certified by and in current good standing with BICSI. The document shall declare that the RCDD is a direct full time employee of the Contractor also that the Contractor will continue to employ a minimum of one RCDD throughout the duration of the project.
    c. List of references for no less than five similar projects (in terms of size and construction cost) performed by the Contractor under the Contractor's current business name within the past three years. Detail the following for each project:
        1) Project name and location
        2) Construction cost
        3) A brief description of the project, the components involved, and the SCS manufacturer used on the project.
        4) Number of station drops
        5) Customer contact names, phone numbers, and addresses

2. Submit patch panel and wire management elevations as follows:
    a. Where patch panels and wire management are to be provided as shown on the Contract Documents, do not submit elevations. Submit written documentation stating that the patch panel and wire management will be provided as shown on the Contract Documents, that the Contractor has reviewed the elevations on the Contract Documents with applicable Subcontractors and suppliers and agrees that it does not create conflicts between trades, and that the elevations meet applicable codes, regulations and standards.
    b. Where changes to patch panels and wire management are proposed, submit patch panel and wire management elevations along with written documentation detailing the reason for the change. The change request must be approved in writing by the Engineer after review by the owner prior to proceeding with the change.

3. Submit a list of proposed test equipment for use in verifying the installation of the SCS. Proposed test equipment shall meet the criteria as stated in PART 3 – TESTING.
    a. Submit for each testing device:
        1) Manufacturer and product number
        2) Documentation from the manufacturer showing date and outcome of last re-calibration. Testing device shall have been re-calibrated within the manufacturer's recommended calibration period, encompassing the period of time when the testing device will be used on this project.
        3) Documentation from the manufacturer showing software revision. Software revision shall be most current revision available for the device and shall be based upon the most current ANSI/TIA/EIA testing guidelines.

4) Testing equipment must be approved by engineer after review by the owner.

C. Closeout Submittals: Provide submittal information for review as follows:

1. A communications-specific Operations and Maintenance (O&M) Manual for Communications shall be required for this project. O&M information submitted under other related communications sections (e.g. Raceway and Boxes for Communications Circuits, Bonding and Grounding for Communications, etc.) shall be included in the O&M Manual and statements should be included in each section directing the Contractor to provide applicable information in the O&M Manual for Communications.

2. O&M Manual for Communications - At the completion of the project, submit O&M information from product data submittals (above), updated to reflect any changes during the course of construction, to the Engineer/Designer in the telecommunications-specific O&M Manual for Communications binder labeled with the project name and description. Provide bound copies of the O&M Manual for Communications per Division 1.

3. Records - Maintain at the job site a minimum of one set of Record Drawings, Specification, and Addenda. Record Drawings shall consist of redline markups of changes to Contract Documents such as drawings, specifications and spreadsheets, including maintenance hole/handhole butterfly drawings.
   a. Document changes to the system from that originally shown on the Contract Documents and clearly identify system component labels and identifiers on Record Drawings.
   b. Keep Record Drawings at the job site and make available to the Owner and Engineer/Designer at any time.
   c. Keep Record Drawings current throughout the course of construction. (“Current” is defined as not more than one week behind actual construction).
   d. Show identifiers for major infrastructure components on Record Drawings.

1.6 QUALITY ASSURANCE

A. Contractor Qualifications:

1. Contractor shall be trained and certified by the Manufacturers to install, test, and maintain the system and be certified by the Manufacturers to provide the Manufacturers’ Warranties (see PART 1 - WARRANTY).

2. Contractor’s employees directly involved with the supervision, installation, testing, and certification of the SCS shall be trained and certified by the selected SCS’ manufacturers. Training and certifications by employee type are required as shown below:
   a. Supervisors/Project Foremen: All (100%) shall be trained/certified for installation and testing.
   b. Test Technicians: All (100%) shall be trained/certified for installation and testing.
   c. Installation Technicians: Prior to bidding, half (50%) shall be trained/certified for installation. Upon award of the project, the remaining untrained

installation technicians shall be trained and certified by the manufacturer at no cost to the Owner.

d. Other personnel: Personnel not directly responsible for installation supervision, installation, testing or certifying the SCS (i.e. project managers, cleanup crew, etc.) are not required to be manufacturer trained and certified. Otherwise, personnel not manufacturer-trained and certified shall not be allowed on the job site.

3. Contractor's employees whose duties include the application of firestopping material shall be trained and certified by the specified firestopping manufacturer. Training and certifications by employee type are required as shown below:
   a. Supervisors/Project Foremen: All (100%) shall be trained/certified for installation.
   b. Firestopping Technician: All (100%) shall be trained/certified for installation.

4. Contractor shall employ a minimum of one Registered Communications Distribution Designer (RCDD) certified by and in current good standing with BICSI. The RCDD shall be a direct full time employee of the Contractor (i.e. an RCDD consultant/sub-contractor to the Contractor is not acceptable). Contractor shall continue to employ a minimum of one RCDD throughout the duration of the project.

5. Contractor shall have successfully completed no less than five similar projects (in terms of size and construction cost) under the Contractor's current business name within the past three years.

1.7 SCHEDULE

A. Provide coordination with the cabling manufacturers to ensure that manufacturers' inspectors are available to schedule site visits, inspections, and certification of the system. Provide and coordinate any manufacturer-required modifications and have manufacturer re-inspect and certify the system prior to the scheduled use of the system by the Owner. Owner will attend manufacturer's inspections. Provide 1 week written notice prior to any inspections.

B. The Contractor is solely responsible for all costs associated with scheduling the manufacturer inspection, the inspection itself and any manufacturer-required re-inspections, and for any modifications to the installation as required by the manufacturers.

1.8 WARRANTY

A. Manufacturer Warranties:

1. Provide nCompass Product and System Performance Warranty for Category 6 Permanent Link. If other manufacturers besides Superior Essex and Ortronics are used, the manufacturers equivalent warranty shall be provided. The System Manufacturer warranties shall warrant:
   a. That the products will be free from manufacturing defects in materials and workmanship.
   b. All copper products shall meet EIA/TIA Category 6 requirements.

c. That the cabling products of the installed system shall exceed the specification of ANSI/TIA/EIA 568-B and exceed ISO/IEC 11801 standards.
d. That the installation shall exceed the specification of ANSI/TIA/EIA 568-B and exceed ISO/IEC 11801 standards.
e. That the system shall be application independent and shall support both current and future applications that use the ANSI/TIA/EIA 568-B and ISO/IEC 11801 component and link/channel specifications for cabling.

2. Provide materials and labor attributable to the fulfillment of this warranty at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 GENERAL

A. Unless specifically stated as “Or equal”, equivalent items are not acceptable. Provide items as specified.

B. Physically verify existing site conditions prior to purchase and delivery of the materials, including but not limited to lengths of conduit and/or pathway to be used for routing backbone cabling. Pre-cut materials of insufficient length are the sole responsibility of the Contractor.

C. Components shall be manufactured by the manufacturers listed below. Components shall not be intermixed between different manufacturers unless the manufacturer has listed (in writing) another manufacturer’s component as an “Approved Alternative Product” and will warrant the “Approved Alternative Product” as part of the Manufacturer Warranty (see PART 1.9 - WARRANTY).

1. Ortronics/SuperiorEssex or equal

D. All copper-related components shall be part of the copper product line – components shall not be intermixed between manufacturers’ product lines. The SCS product lines shall be engineered “end-to-end” – the system and all of its components shall be engineered to function together as a single, continuous transmission path.

E. Provide all incidental and/or miscellaneous hardware not explicitly specified or shown on the Contract Documents that is required for a fully operational, tested, certified and warranted system.

2.2 DATA (D) AND TELEPHONE (T) CABLE

A. Category 6: Shall exceed Category 6 transmission requirements as specified in ANSI/TIA/EIA 568-B and ISO/IEC 11801: Superior/Essex Nextgain#54-246-2B plenum rated. Cable shall be blue. Cable shall not be run underground

2.3 OUTLETS

A. Outlets shall be EIA/TIA 568 Category 6, modular with number of RJ45 jacks indicated by Symbol on front. Provide blanks in unused sections. Gray Color. Label all jacks individually. Ortronics Cat 6 RJ-45 or equal. Plate shall be stainless steel with 6 mounting spaces.

2.4 DATA PATCH PANELS

A. EIA/TIA 568, Category 6, RJ45 insert jacks on front. Ortronics 48-port patch panel or equal. Provide one patch panel, mount to existing rack. Label with jack number shown on drawings.

2.5 PATHWAYS AND CABLE SUPPORTS

A. All cabling pathways are to be installed within 4 feet of the ceiling grid. No cabling pathway is to be located above 4 feet above ceiling grid.

B. Cable Supports: All cable to be installed in Raceway, Cable Tray or supported with 4” J-Hooks.

C. Pull Strings: Plastic or nylon with a minimum test rating of 200 lb.

D. Velcro Wraps: Leviton#45224-RCS

2.6 LABELING AND ADMINISTRATION

A. Labels:

1. As recommended in ANSI/TIA/EIA 606. Permanent (i.e. not subject to fading or erasure), permanently affixed, and created by a hand-carried label maker or a computer/software-based label making system. Handwritten labels are not acceptable.
    a. For Station Cable:
        1) Brady: Bradymaker Wire Marking Labels WML-511-292 (or approved equal)
    b. For Backbone Cable:
        1) Panduit Marker Tie (or approved equal) in the MDF and IDF within 12" of termination point.

B. Hand-carried label maker:

1. Brady: ID Pro Plus (or approved equal).

PART 3 - EXECUTION

3.1 GENERAL

A. The Contractor is solely responsible for the safety of the public and workers in accordance with all applicable rules, regulations, building codes and ordinances.

B. All work shall comply with applicable safety rules and regulations including OSHA and WISHA. All work shall comply with the requirements of the National Electrical Safety Code (NESC) and the NEC except where local codes and/or regulations are more stringent, in which case the local codes and/or regulations shall govern.

C. All work shall comply with the standards, references and codes listed in PART 1 -- REFERENCES above. Where questions arise regarding which standards, references, or codes apply, the more stringent shall prevail.

D. All work shall comply with the requirements and recommendations of the product manufacturers. Where questions arise regarding which requirements and recommendations apply, the more stringent shall prevail.

E. Replace and/or repair to original (or better) condition any existing structures, materials, equipment, etc. inadvertently demolished or damaged by the Contractor during the course of construction at no additional cost to the Owner.

F. Remove surplus material and debris from the job site and dispose of legally.

3.2 RACEWAY

A. Cable run layouts indicated on the drawings are generally diagrammatic. Exact routing of conduit and wiring shall be governed by the location of obstructions and building structural conditions. Cable runs shall strictly adhere to BICSI standards for EMI distances.

B. All cable shall be routed to prevent interference with any existing systems such as access boxes, ventilation mixing boxes, access hatches to air filters, switch panels, fire alarm equipment, clock systems, lighting fixtures, etc. All pathways for copper cable shall be a minimum of 12" from all fluorescent lighting ballasts, fire alarm, paging and any other low voltage cables not in EMT or flex conduit. The routing must not interfere with any other service or system, operation or maintenance. Raceway shall not be placed in close contact with other devices, electrical or otherwise, that will interfere with it's proper operation as a transmitter of data signal as per TIA/EIA 569-A. The contractor will be responsible for rerouting any raceway that is not acceptable to the Engineer at contractor's expense.

C. J-Hooks SHALL be 4” minimum and supported directly to structure.

D. Data and phone cables shall not share sleeves with any other cables.

E. All cables passing into and out of all IDFs and MDFs must be in sleeves with bushings and have proper fill ratios.

F. Sleeves: Provide sleeves where required for cable pass-thru through building structures and/or fire rated barriers. Provide roto-hammering or core drilling where required for sleeve installation. Seal (and if a fire rated barrier, firestop) between sleeve and building structure and/or barrier. Size sleeves:

1. As noted in the Contract Documents.

2. Where not noted, size sleeves a minimum of 2 inches in diameter or by the type and quantity of cable to be routed through the sleeve per ANSI/TIA/EIA 569 cable capacity standards plus an additional 100% for future expansion - whichever is greater.

G. D-Rings: Provide D-Rings as necessary for vertical management only for exposed cables on backboards in telecommunications rooms.

H. Pull Strings: Provide a pull string in conduits that are to remain vacant.

3.3 CONNECTORS

A. Copper Connectors (modular jacks):

1. For Horizontal Distribution:
   a. Provide connectors and install using T568A wiring pattern.
   b. Mount connectors at 90-degrees (i.e. straight, not angled)
   c. Must re-apply all dust covers to all jacks after punching down the cable.
   d. All terminations must adhere to BICSI standards. All cable punched down on CAT6A jacks must approach the jack normal to the plane of the punch down terminals.

3.4 STATIONS

A. Faceplates: Provide faceplates for stations in the locations and gang counts shown on the Contract Documents. Faceplates shall completely conceal outlet boxes, reducer plates, etc. Faceplates shall provide a snug and sure fit for connectors – loose connectors are not acceptable and be mounted neatly and parallel to adjacent building lines.

1. Flush-mount connectors on faceplates.

B. Faceplate Mounting Brackets: Provide faceplate mounting brackets as required and as shown for flush mounted communications outlets. Provide blanks in all unused ports.

3.5 CABLE

A. General (applicable to all cable types): Provide plenum (CMP, OFNP) rated cable. Cabling shall bear plenum markings for the environment in which it is installed.

1. For Horizontal Distribution: Provide station cable in types, sizes, and quantities as shown on drawings. Install cable between the station and it's associated telecommunications room. Provide one cable per each connector at each station.

2. Install cable in compliance with ANSI/TIA/EIA and ISO/IEC 11801 requirements and BICSI ITSIM (previously TCIM) practices.

3. Adhere to the bending radius and pull strength requirements as detailed in the ANSI/TIA/EIA standards and the manufacturer's installation recommendations during cable handling and installation.
   a. Pull all cables simultaneously where more than one cable is being installed in the same raceway.
   b. Use pulling compound or lubricant where necessary. Use compounds that will not damage conductor or insulation (Polywater, or approved equal).
   c. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage media or raceway. Repair or replace conduit bushings that become damaged during cabling installation.

4. Install cable in a continuous (non-spliced) manner unless otherwise indicated.

5. Install exposed cable parallel to and perpendicular to surfaces on exposed structural members and follow surface contours where possible.

6. Tie or clamp cabling. Attaching cables to pipes, electrical conduit, mechanical items, existing cables, or the ceiling support system (grids, hanger wires, etc.) is not acceptable. Install velcro-wraps in conformance with the SCS manufacturer's installation recommendations. Do not over-tighten velcro wraps or cause cross-sectional deformation of cabling.

7. Cable at the backboards:
   a. Lay and dress cables to allow other cables to enter raceway (conduit or otherwise) without difficulty at a later time by maintaining a working distance from these openings.
   b. Route cable as close as possible to the ceiling, floor, sides, or corners to insure that adequate wall or backboard space is available for current and future equipment and for cable terminations.
   c. Lay cables via the shortest route directly to the nearest edge of the backboard from mounted equipment or blocks. Support cables so as not to create a load on the equipment upon which the cables are terminated. Velcro-wrap similarly routed and similar cables together and attach to D-rings vertically and/or horizontally, then route over a path that will offer minimum obstruction to future installations of equipment, backboards or other cables.

8. Cable in the telecommunications rooms:
   a. For telecommunications rooms with ladder rack, lay cable neatly in ladder rack in even bundles and loosely secure cabling to the ladder rack at regular intervals with velcro straps.

b. Any cable(s) entering MDF/IDF must be collected onto ladder rack(s) mounted to perimeter wall(s) forming a continuous pathway connecting to the rack(s).

9. Cable terminating on patch panels located on racks:
   a. Route cables in telecommunications rooms to patch panels on racks by routing across ladder rack across top of rack and then down vertical ladder rack to patch panel.

B. Copper Cable: Terminate all pairs within a cable. Un-terminated cable pairs are not acceptable.

1. For horizontal distribution: Provide station cable in the locations shown on the Contract Documents. Provide service loops with a minimum length of 36 inches above each drop location at the entrance of each stubbed conduit above the ceiling grid and for classroom drop conduits running entirely to primary hallway cable trays, then lay cable loosely in tray to act as future slack.

2. For intrabuilding backbone distribution: Install intrabuilding backbone cable in the locations shown on the Contract Documents. Provide a service loop long enough in the TR's to reach termination equipment if moved to the farthest side of the room in the future, but no less than a minimum length of 10 feet at each end.
   a. Use unshielded, non-plenum multi-pair copper cable for connecting the back side of termination blocks to entrance protectors, telephone systems, and voice grade active electronics.
   b. For shielded cable, bond both ends of the metallic shield (or metallic strength) member to the nearest TGB (as furnished under Division 16 Section — "Grounding and Bonding").

3.6 LABELING AND ADMINISTRATION

A. General: Labeling and administration shall comply with ANSI/TIA/EIA 606 and standard industry practices.

B. Must use Times New Roman serif font at 18 point for faceplate labeling and fit to size legibly for patch panel labels so as to distinguish between "I" and "1".

C. Color Coding: Apply industry standard color coding to cable termination fields. Always apply the same color at both ends of any given cable. Cross-connections are generally made between termination fields of different colors. The color may be applied to the backboard behind the termination equipment, may be the color of a cover on the termination equipment, or may be the actual color of the insert label on the termination equipment. Use the following color code:

1. Orange: Identification of the telecommunication service (telephone company) demarcation point.

2. Green: Identification of network connections on the customer side of the demarcation point.

3. White: Identification of first-level backbone in the building containing the main cross-connect, or may be used to identify the second-level backbone in buildings not containing the main cross-connect.

4. Gray: Identification of the second-level backbone in the building containing the main cross-connect.

5. Blue: Identification of the horizontal distribution (station) cables. A blue color coding is only required at the telecommunications room end of the cable, not at the station end of the cable.

D. Cables:

1. Label Location: Label at each end of the cable within 12" of the termination.

2. Station Cables: Label station cables with the same label as the station connector (see STATION CONNECTORS (PORTS) below) that terminates the cable at the station location. Handwritten (neat and legible) labels using a permanent black marker such as a Sharpie are allowed.

3. Copper Backbone Cables: Label intrabuilding copper backbone cables in the form “C (MDF to IDF), ###-PR, CAT##, ###-FT ” where “C” stands for media type (“C” for “administrative copper” media), “(MDF to IDF)” is the origination and destination telecommunications rooms between which the cable routes, “###-PR” is the pair count, “CAT##” is the cable type (i.e. CAT3 or CAT5E), and ###-FT is the cut length.
   a. a. Example: If a copper backbone cable running between MDF1 and IDF6 were a 150-FT long, 100-PR, CAT3 cable, then the label for the cable would read “C (MDF1 to IDF6), 100-PR, CAT3, 150-FT”

4. Provide labels at each end of each cable within 12” of telecommunications room entrance and again within 24” of termination point.

E. Termination Blocks:

1. General:
   a. Label termination block ports/pairs sequentially beginning on the first row of each termination block column. Begin with “001” for the first port/pair.
   b. Label termination strip pairs sequentially (left to right).

F. Patch Panels:

1. For Horizontal Distribution:
   a. General: Label patch panels as shown on the Contract Documents.
   b. IDF to MDF Uplink Ports: In each IDF and in the MDF, label copper uplink ports using the following format:
      MIDF#-#
      (Example - MIDF2-1)
   c. Must use TIA/EIA 598-A color code for all fiber strand termination and all terminated fiber needs to be in the recommended order and be consistent at both ends.

d. Both ends of fiber termination must be labeled to identify where the other end is coming from. A fiber legend displayed inside the termination box is acceptable.
e. Label fiber termination box with destination IDF or MDF.

G. Station Connectors (Ports): (See 2.5.B)

H. Conduits: Label each conduit end in a clear manner by designating the location of the other end of the conduit (i.e. room name, telecommunications room identifier, pull box identifier, outlet identifier (use the label of the first port of the outlet as the outlet identifier), etc.).

3.7 TESTING

A. Provide test records on a form approved by the Owner and Engineer/Designer. Include the test results for each cable in the system. Submit the test results for each cable tested with identification as discussed under LABELING AND ADMINISTRATION above. Include the cable identifier, outcome of test, indication of errors found, cable length, retest results, and name and signature of technician completing the tests. Provide test results to the Owner and Engineer/Designer for review and acceptance within two weeks of Substantial Completion.

1. Print test records for each cable within the system directly from the tester and submit in paper form (in a binder) and in electronic form (on CDROM) to be reviewed by the Owner and approved by the Engineer. Handwritten test results will not be accepted nor any spreadsheet tabulated data forms.

B. Test the SCS after installation for compliance to all applicable standards as follows:

1. Copper:
   a. For Horizontal Distribution, including Backbone Distribution: Test all pairs of each copper station cable, for conformance to ANSI/TIA/EIA 568-B Category 6in the Base Bid and Category 6A, and ANSI/TIA/EIA 568-B standards. To the extent possible, perform tests with building electrical systems fully powered on (i.e. Lights, HVAC, etc.).
      1) Test each end-to-end link (the entire channel from the connector at the station to the connector or termination in the telecommunications room) utilizing sweep tests, for alien cross talk, continuity, shorts, polarity, near-end cross talk (NEXT), far-end cross talk (FEXT), attenuation, installed length, transposition (wire map), mutual capacitance, characteristic impedance, resistance, ACR, and presence of AC voltage. Use the Power Sum method to test NEXT and FEXT.
      2) Use a TIA/EIA Level III testing instrument from either Fluke or Agilent Wirescope, or owner pre-approved for all copper testing. The test instrument needs to be re-calibrated within the manufacturer's recommended calibration period, with the most current software revision based upon the most current ANSI/TIA/EIA testing guidelines and be capable of storing and printing test records for each cable within the system.

3) In addition to the above, perform tests both recommended and mandated by Leviton for Permanent Link. Tests shall confirm/guarantee compliance to Levition Ethernet Category 6A 10GBase-T (10000 Mb/s IEEE 802.3ab) and 10000B-TX (1000 Mb/s ANSI/TIA/EIA-854)

C. Identify cables and equipment that do not pass to the Owner and Engineer/Designer. No marginal or star passes allowed. Marginal Pass must be enabled on all test instruments. All FAILS need to be corrected and no re-certify status of test data accepted. Determine the source of the non-compliance and replace or correct the cable or the connection materials, and retest the cable or connection materials at no additional expense to the Owner. Provide new test results to the Owner and Engineer/Designer in the same manner as above.

1. In addition to the above, if it is determined that the cable is at fault, remove the damaged cable and replace it with a new cable. Cable “repairs” are not acceptable. The procedure for removing the cable shall be as follows:
   a. Prior to removal of damaged cable and installation of new cable:
      1) Inform the Owner and Engineer/Designer of the schedule for the removal and installation.
      2) Test the new cable on the reel per paragraph B, above.
      3) Test cables that occupy the same innerduct or conduit (if not in innerduct) as the damaged cable per paragraph B, above, regardless of whether or not they are new cables installed as part of this project or existing cables installed prior to this project.
      4) Provide test results to the Owner and Engineer/Designer for approval by the Owner and Engineer/Designer.
   b. Remove the damaged cable and provide new cable.
   c. After the removal of the damaged cable and installation of the new cable:
      1) Test the new cable per the paragraph titled TESTING.
      2) Test cables that occupy the same innerduct or conduit (if not in innerduct) as the damaged cable per paragraph B, above, regardless of whether they are new cables installed as part of this project or existing cables installed prior to this project.
         a) If any of the cables requiring testing are in use, coordinate with the Owner to schedule an outage opportunity during which the testing can be performed.
      3) Provide test results to the Owner and Engineer/Designer for approval by the Owner and Engineer/Designer.
   d. If a cable which occupies the same innerduct or conduit (if not in innerduct) as a damaged cable is damaged by the extraction and installation process, replace the cable at no additional expense to the Owner.
      1) Damaged cables which are replaced shall be subject to the testing procedures of the paragraph titled TESTING.

END OF SECTION 27 15 00

SECTION 27 51 23 – COMMUNICATIONS INTERCOM/CLOCK PROGRAM SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION

1.2 Furnish, install and place in operation speaker and clock devices as indicated on plans. Devices shall be connected to existing ANETD Model #IPSWD-RWB system. Devices shall match existing types used in school.

1.3 CODES AND STANDARDS

A. All wiring shall be in accordance with the requirements of Article 725 of the National Electrical Code for Class 2 Signaling Systems, applicable local codes and manufacturer's wiring diagrams.

PART 2 - EQUIPMENT

2.1 INTERCOM HEAD END EQUIPMENT

A. The existing intercom headen shall be upgraded to accommodate the new speakers and clocks shown on the plans. Provide modules, station cards, power supplies, amplifiers and programming as required.

B. The Class II amplifier shall be capable of an audio output of 60 watts at less than 3% distortion (60 Hz to 15 kHz), and shall have a peak output of 100 watts

2.2 CONE SPEAKER/TRANSFORMER ASSEMBLY

A. The speaker shall be an 8" permanent magnet cone-type having a viscous-damped cone, and a ceramic magnet weighing at least 6 ounces.

B. The speaker assembly shall be equipped with a dual-winding (25-volt/70-volt) line matching transformer. It shall provide 1/8, 1/4, 1/2, 1, 2 and 4 watt power taps for both 25-volt and 70-volt operation.

2.3 CEILING-MOUNTED ROUND GRILLE/ENCLOSURE

A. The round speaker grille shall be constructed of steel. The finish shall be a hard baked semi-gloss white enamel. The grille shall have a diameter of 12-3/4", and shall be designed to accommodate a standard 8" loudspeaker.

B. The metal protective enclosure shall have a plaster flange external to the enclosure, with a grille-mounting flange internal to the enclosure. The enclosure shall have four combinations 1/2" to 3/4" conduit knockouts.

2.4 WALL-MOUNTED SQUARE GRILLE/ENCLOSURE

A. The square speaker grille shall be constructed of heavy gauge cold rolled steel, and shall have a baked enamel finish. The grille shall have a square opening with a separate sub-plate for mounting to an enclosure.

B. The grille shall be 12-5/8" square. The grille shall accommodate an 8" loudspeaker.

C. Where flush mounted, the grille shall be mounted to a metal protective enclosure constructed of heavy gauge cold rolled steel with the interior undercoated and jute patch lined to prevent mechanical and acoustical resonance.

1. Model RE1175.

D. Where surface mounted, the grille shall be mounted to a metal protective enclosure constructed of 20 gauge cold rolled steel. The enclosure dimensions shall be 12-3/4" square by 4" deep. The enclosure shall be finished in a hard baked semi-gloss white enamel.

1. Model SE1275.

2.5 ANALOG SECONDARY CLOCKS

A. Analog clocks, as shown on the plans, are to be 24VAC 12" synchronous type. Commons clocks shall be 16" Analog type. Analog clocks shall mount to standard electrical backboxes.

B. Output to clocks shall be power limiting for Class 2 wiring system per N.E.C.

2.6 CLOCK/SPEAKER GRILLE AND ENCLOSURE

A. The analog clock/speaker grille shall include a faceplate with painted finish, integral clock mounting bracket, and integral speaker mounting bracket. The combination wall boxes shall be 16-gauge minimum. Boxes shall be installed flush or surface as indicated on the drawings. The 16” clocks shall be mounted independently of speakers.

PART 3 - INSTALLATION

3.1 CABLE

A. Provide cabling as required by manufacturer. Plenum rated.

3.2 INSTRUCTION AND MAINTENANCE MANUALS

A. Upon completion of the installation, the Contractor shall furnish the Owner with three system manuals each containing the following where applicable. Operating instructions and maintenance manuals of all equipment.

3.3 GUARANTEE AND MAINTENANCE

A. A two-year warranty covering all components, equipment, and workmanship shall be submitted in writing with system documentation. The warranty period shall begin on the system's first use by the school.

B. Should any trouble develop within this two-year period due to inferior or faulty material and/or workmanship the Contractor shall promptly make all required corrections without cost to the Owner.

END OF SECTION 27 51 23

SECTION 28 31 11 – FIRE ALARM SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section of the specification includes the furnishing, installation, connection and testing of the microprocessor controlled, intelligent reporting fire alarm equipment required to form a complete, operative, coordinated system. It shall include, but not be limited to, alarm initiating devices, alarm notification appliances, auxiliary control devices, and wiring as shown on the drawings and specified herein. Devices shall be connected to the existing Notifier AFP200 fire alarm system.

B. 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. The fire alarm system shall be manufactured by an ISO 9001 certified company and meet the requirements of BS EN9001: ANSI/ASQC Q9001-1994.

D. The FACP and peripheral devices shall be manufactured 100% by a single U.S. manufacturer (or division thereof).

E. 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.

F. The installing company shall employ NICET (minimum Level II Fire Alarm Technology) technicians on site to guide the final checkout and to ensure the systems integrity.

1.2 SCOPE

A. New intelligent reporting, microprocessor controlled fire detection devices shall be installed and connected to the existing system in accordance to the project specifications and drawings.

B. Basic Performance:

1. Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded on NFPA Style 4 (Class B) Signaling Line Circuits (SLC).

2. Initiation Device Circuits (IDC) shall be wired Class A (NFPA Style D) as part of an addressable device connected by the SLC Circuit.

3. Notification Appliance Circuits (NAC) shall be wired Class A (NFPA Style Z) as part of an addressable device connected by the SLC Circuit.

4. On Style 6 or 7 (Class A) configurations a single ground fault or open circuit on the system Signaling Line Circuit shall not cause system malfunction, loss of operating power or the ability to report an alarm.

5. Alarm signals arriving at the FACP shall not be lost following a primary power failure (or outage) until the alarm signal is processed and recorded.

C. BASIC SYSTEM FUNCTIONAL OPERATION

When a fire alarm condition is detected and reported by one of the system initiating devices, the following functions shall immediately occur:

1. The system alarm LED on the system display shall flash.

2. A local piezo electric signal in the control panel shall sound.

3. A backlit LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.

4. Printing and history storage equipment shall log the information associated each new fire alarm control panel condition, along with time and date of occurrence.

5. All system output programs assigned via control-by-event interlock programming to be activated by the particular point in alarm shall be executed, and the associated system outputs (notification appliances and/or relays) shall be activated.

6. Sound all devices and light all strobes

7. Fan Shutdown via direct connection to starter coil

8. Smoke Damper Close.

9. Elevator Recall per AHJ

10. Report to DDC

11. Report to Central Monitoring Agency

1.3 SUBMITTALS

A. General:

1. Submittals shall be submitted to the Architect/Engineer for review.

2. All references to manufacturer's model numbers and other pertinent information herein is intended to establish minimum standards of performance, function and quality. Equivalent compatible UL-listed equipment from other manufacturers may be substituted for the specified equipment as long as the minimum standards are met.

3. For equipment other than that specified, the contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment.

B. Shop Drawings:

1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.

2. Include manufacturer's name(s), model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.

3. Show annunciator layout, configurations, and terminations.

C. Manuals:

1. Submit simultaneously with the shop drawings, complete operating and maintenance manuals listing the manufacturer's name(s), including technical data sheets.

2. Wiring diagrams shall indicate internal wiring for each device and the interconnections between the items of equipment.

3. Provide a clear and concise description of operation that gives, in detail, the information required to properly operate the equipment and system.

D. Software Modifications

1. Provide the services of a factory trained and authorized technician to perform all system software modifications, upgrades or changes. Response time of the technician to the site shall not exceed 4 hours.

2. Provide all hardware, software, programming tools and documentation necessary to modify the fire alarm system on site. Modification includes addition and deletion of devices, circuits, zones and changes to system operation and custom label changes for devices or zones. The system structure and software shall place no limit on the type or extent of software modifications on-site.

E. Certifications:

1. Together with the shop drawing submittal, submit a certification from the major equipment manufacturer indicating that the proposed 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.

1.4 GUARANTY:

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.

1.5 POST CONTRACT MAINTENANCE:

Complete maintenance and repair service for the fire alarm system shall be available from a factory trained authorized representative of the manufacturer of the major equipment for a period of five (5) years after expiration of the guaranty.

1.6 APPLICABLE STANDARDS AND SPECIFICATIONS:

The specifications and standards listed below form a part of this specification. The system shall fully comply with the latest issue of these standards, if applicable.

A. National Fire Protection Association (NFPA) - USA:

1. No. 13 Sprinkler Systems
2. No. 72 National Fire Alarm Code
3. No. 101 Life Safety Code

B. Underwriters Laboratories Inc. (UL) - USA:

1. No. 268 Smoke Detectors for Fire Protective Signaling Systems
2. No. 864 Control Units for Fire Protective Signaling Systems
3. No. 268A Smoke Detectors for Duct Applications
4. No. 521 Heat Detectors for Fire Protective Signaling Systems
5. No. 464 Audible Signaling Appliances
6. No. 38 Manually Actuated Signaling Boxes
7. No. 346 Waterflow Indicators for Fire Protective Signaling Systems
8. No. 1076 Control Units for Burglar Alarm Proprietary Protective Signaling Systems
9. No. 1971 Visual Notification Appliances

C. Local and State Building Codes.

D. All requirements of the Authority Having Jurisdiction (AHJ).

1.7 APPROVALS:

A. The system shall have proper listing and/or approval from the following nationally recognized agencies:

1. UL Underwriters Laboratories Inc

B. The fire alarm control panel shall meet UL Standard 864 (Control Units) and UL Standard 1076 (Proprietary Burglar Alarm Systems).

PART 2 - PRODUCTS

2.1 EQUIPMENT AND MATERIAL, GENERAL:

A. All equipment and components shall be new, and the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protective signaling system, meeting the National Fire Alarm Code.

B. 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.

C. 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.

2.2 CONDUIT AND WIRE:

A. Conduit:

1. Conduit shall be in accordance with The National Electrical Code (NEC), local and state requirements.

2. Where required, all wiring shall be installed in conduit or raceway. Conduit fill shall not exceed 40 percent of interior cross sectional area where three or more cables are contained within a single conduit.

3. Cable must be separated from any open conductors of power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, per NEC Article 760-55.

4. Wiring for 24 volt DC control, alarm notification, emergency communication and similar power-limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals.

5. Conduit shall not enter the fire alarm control panel, or any other remotely mounted control panel equipment or backboxes, except where conduit entry is specified by the FACP manufacturer.

6. Conduit shall be 3/4-inch (19.1 mm) minimum.

B. Wire:

1. All fire alarm system wiring shall be new and listed for the application. Install in conduit where in walls are above non-accessible ceilings.

2. Wiring shall be in accordance with local, state and national codes (e.g., NEC Article 760) 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 (1.02 mm) for Initiating Device Circuits and Signaling Line Circuits, and 14 AWG (1.63 mm) for Notification Appliance Circuits.

3. All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.

4. 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).

5. Wiring used for the multiplex communication circuit (SLC) shall be twisted and unshielded and support a minimum wiring distance of 12,500 feet. The design of the system shall permit use of IDC and NAC wiring in the same conduit with the SLC communication circuit.

6. All field wiring shall be electrically supervised for open circuit and ground fault.

7. T-tapping is not acceptable.

C. Terminal Boxes, Junction Boxes and Cabinets:

1. All boxes and cabinets shall be UL listed for their use and purpose.

D. 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.

2.3 MAIN FIRE ALARM CONTROL PANEL (FACP), (FAP):

A. Existing Honeywell XLS140-2(E). Upgrade as required to support added devices.

B. Auxiliary Field Power Supply - Addressable

1. The auxiliary addressable power supply is a remote 24 VDC power supply used to power Notification Devices and field devices that require regulated 24VDC power. The power supply shall also include and charge backup batteries.

2. The addressable power supply for the fire alarm system shall provide up a minimum of 6.0 amps of 24 volt DC regulated power for Notification Appliance Circuit (NAC) power or 5 amps of 24 volt DC general power. The power supply shall have an additional .5 amp of 24 VDC auxiliary power for use within the same cabinet as the power supply. It shall include an integral charger designed to charge 7.0 - 25.0 amp hour batteries.

3. The addressable power supply shall provide four individually addressable Notification Appliance Circuits that may be configured as two Class "A" and two

Class "B" or four Class "B" only circuits. All circuits shall be power-limited per UL 864 requirements.

4. The addressable power supply shall provide built-in synchronization for certain Notification Appliances on each circuit without the need for additional synchronization modules. The power supply's output circuits shall be individually selected for synchronization. A single addressable power supply shall be capable of supporting both synchronized and non-synchronized Notification Devices at the same time.

5. The addressable power supply shall operate on 120 or 240 VAC, 50/60 Hz.

6. The interface to the power supply from the Fire Alarm Control Panel (FACP) shall be via the Signaling Line Circuit (SLC) or other multiplexed means Power supplies that do not use an intelligent interface are not suitable substitutes. The required wiring from the FACP to the addressable power supply shall be a single unshielded twisted pair wire. Data on the SLC shall be transmitted between 24 VDC, 5 VDC and 0 VDC at approximately 3.33k baud.

7. The addressable power supply shall supervise for battery charging failure, AC power loss, power brownout, battery failure, NAC loss, and optional ground fault detection. In the event of a trouble condition, the addressable power supply shall report the incident and the applicable address to the FACP via the SLC.

8. The addressable power supply shall have an AC Power Loss Delay option. If this option is utilized and the addressable power supply experiences an AC power loss, reporting of the incident to the FACP will be delayed. A delay time of eight or sixteen hours shall be Dip-switch selected.

9. The addressable power supply shall have an option for Canadian Trouble Reporting and this option shall be Dip-switch selectable.

10. The addressable power supply mounts in either the FACP backbox or it's own dedicated surface mounted backbox with cover.

11. Each of the power supply's four output circuits shall be DIP-switch selected for Notification Appliance Circuit or General Purpose 24 VDC power. Any output circuit shall be able to provide up to 2.5 amps of 24 VDC power.

12. The addressable power supply's output circuits shall be individually supervised when they are selected to be either a Notification Appliance Circuit when wired Class "A" or by the use of and end-of-line resistor. When the power supply's output circuit is selected as General 24VDC power, the circuit shall be individually supervised when an end-of-line relay is used.

13. When selected for Notification Appliance Circuits, the output circuits shall be individually DIP-switch selectable for Steady, March Time, Dual Stage or Temporal.

14. When selected as a Notification Appliance Circuit, the output circuits of the addressable power supply shall have the option to be coded by the use of a universal zone coder.

15. The addressable power supply shall interface and synchronize with other power supplies of the same type. The required wiring to interface multiple addressable power supplies shall be a single unshielded, twisted pair wire.

16. An individual or multiple interfaced addressable power supplies shall have the option to use an external charger for battery charging. Interfaced power supplies shall have the option to share backup battery power.

17. Any remote power supplies proposed shall be provided with all 120 volt circuits required to support at no increase in contract sum.

C. Field Charging Power Supply (FCPS)

The FCPS is a device designed for use as either a remote 24 volt power supply or used to power Notification Appliances.

1. The FCPS shall offer up to 6.0 amps (4.0 amps continuous) of regulated 24 volt power. It shall include an integral charger designed to charge 7.0 amp hour batteries and to support 60 hour standby.

2. The Field Charging Power Supply shall have two input triggers. The input trigger shall be a Notification Appliance Circuit (from the fire alarm control panel) or a relay. Four outputs (two Style Y or Z and two style Y) shall be available for connection to the Notification devices.

3. The FCPS shall include an attractive surface mount backbox.

4. The Field Charging Power Supply shall include the ability to delay the AC fail delay per NFPA requirements.

5. The FCPS include power limited circuitry, per 1995 UL standards.

6. Any remote power supplies proposed shall be provided with all 120 volt circuits required to support at no increase in contract sum.

2.4 SYSTEM COMPONENTS:

A. Programmable Electronic Sounders:

1. Electronic sounders shall operate on 24 VDC nominal.

2. Electronic sounders shall be field programmable without the use of special tools, to provide slow whoop, continuous, or interrupted tones with an output sound level of at least 90 dBA measured at 10 feet from the device.

3. Shall be flush or surface mounted as show on plans.

B. Strobe lights shall meet the requirements of the ADA, UL Standard 1971, be fully synchronized, and shall meet the following criteria:

1. The maximum pulse duration shall be 2/10 of one second.

2. Strobe intensity shall meet the requirements of UL 1971.

3. The flash rate shall meet the requirements of UL 1971.

C. Audible/Visual Combination Devices:

1. Shall meet the applicable requirements of Section A listed above for audibility.

2. Shall meet the requirements of Section B listed above for visibility.

3. The temperature range of the device shall be -22 degrees F to 131 degrees F.

4. The detector shall feature a bank of four alignment LEDs on both the receiver and the transmitter that are used to ensure proper alignment of unit without special tools.

5. Beam detectors shall feature automatic gain control which will compensate for gradual signal deterioration from dirt accumulation on lenses.

6. The unit shall be both ceiling and wall mountable.

7. The detector shall have the ability to be tested using calibrated test filters or magnet activated remote test station.

D. All interfaces and associated equipment are to be protected so that they will not be affected by voltage surges or line transients consistent with UL standard 864.

E. Field Wiring Terminal Blocks

For ease of service all panel I/O wiring terminal blocks shall be removable, plug-in types and have sufficient capacity for #18 to #12 AWG wire. Terminal blocks that are permanently fixed are not acceptable.

2.5 SYSTEM COMPONENTS - ADDRESSABLE DEVICES

A. Addressable Devices - General

1. Addressable devices shall use simple to install and maintain decade, decimal address switches. Devices shall be capable of being set to an address in a range of 001 to 159.

2. Addressable devices, which use a binary-coded address setting method, such as a DIP-switch, are not an allowable substitute.

3. Detectors shall be intelligent (analog) and addressable, and shall connect with two wires to the fire alarm control panel Signaling Line Circuits.

4. Addressable smoke and thermal detectors shall provide dual alarm and power/polling LEDs. Both LEDs shall flash green under normal conditions, indicating that the detector is operational and in regular communication with the control panel, and both LEDs shall be placed into steady red illumination by the control panel, indicating that an alarm condition has been detected. If required, the LED flash shall

have the ability to be removed from the system program. An output connection shall also be provided in the base to connect an external remote alarm LED.

5. The fire alarm control panel shall permit detector sensitivity adjustment through field programming of the system. The panel on a time-of-day basis shall automatically adjust sensitivity.

6. Using software in the FACP, detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance. The detectors shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA Standard 72, Chapter 7.

7. The detectors shall be ceiling-mount and shall include a separate twist-lock base with tamper proof feature. Bases shall include a sounder base with a built-in (local) sounder rated at 85 DBA minimum, a relay base and an isolator base designed for Style 7 applications.

8. The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a magnetic switch) or initiated remotely on command from the control panel.

9. Detectors shall also store an internal identifying type code that the control panel shall use to identify the type of device (ION, PHOTO, THERMAL).

10. Detectors will operate in an analog fashion, where the detector simply measures its designed environment variable and transmits an analog value to the FACP based on real-time measured values. The FACP software, not the detector, shall make the alarm/normal decision, thereby allowing the sensitivity of each detector to be set in the FACP program and allowing the system operator to view the current analog value of each detector.

11. Addressable devices shall store an internal identifying code that the control panel shall use to identify the type of device.

12. A magnetic test switch shall be provided to test detectors and modules. Detectors shall report an indication of an analog value reaching 100% of the alarm threshold.

13. Addressable modules shall mount in a 4-inch square (101.6 mm square), 2-1/8 inch (54 mm) deep electrical box. An optional surface mount Lexan enclosure shall be available.

B. Intelligent Photoelectric Smoke Detector

1. The detectors shall use the photoelectric (light-scattering) principal to measure smoke density and shall, on command from the control panel, send data to the panel representing the analog level of smoke density.

C. Addressable Dry Contact Monitor Module

1. Addressable monitor modules shall be provided to connect one supervised IDC zone of conventional alarm initiating devices (any N.O. dry contact device) to one of the fire alarm control panel SLCs.

2. The IDC zone shall be suitable for Style D or Style B operation. An LED shall be provided that shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.

3. For difficult to reach areas, the monitor module shall be available in a miniature package and shall be no larger than 2-3/4 inch (70 mm) x 1-1/4 inch (31.7 mm) x 1/2 inch (12.7 mm). This version need not include Style D or an LED.

D. Two Wire Detector Monitor Module

1. Addressable monitor modules shall be provided to connect one supervised IDC zone of conventional 2-wire smoke detectors or alarm initiating devices (any N.O. dry contact device).

2. The IDC zone may be wired for Class A or B (Style D or Style B) operation. An LED shall be provided that shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.

E. Addressable Control Module

1. Addressable control modules shall be provided to supervise and control the operation of one conventional NACs of compatible, 24 VDC powered, polarized audio/visual notification appliances.

2. The control module NAC may be wired for Style Z or Style Y (Class A/B) with up to 1 amp of inductive A/V signal, or 2 amps of resistive A/V signal operation.

3. Audio/visual power shall be provided by a separate supervised power circuit from the main fire alarm control panel or from a supervised UL listed remote power supply.

4. The control module shall be suitable for pilot duty applications and rated for a minimum of 0.6 amps at 30 VDC.

F. Addressable Relay Module

1. Addressable Relay Modules shall be available for HVAC control and other building functions. The relay shall be form C and rated for a minimum of 2.0 Amps resistive or 1.0 Amps inductive. The relay coil shall be magnetically latched to reduce wiring connection requirements, and to insure that 100% of all auxiliary relay or NACs may be energized at the same time on the same pair of wires.

G. Isolator Module

1. Isolator modules shall be provided to automatically isolate wire-to-wire short circuits on an SLC Class A or Class B branch. The isolator module shall limit the number of modules or detectors that may be rendered inoperative by a short circuit fault on the

SLC loop segment or branch. At least one isolator module shall be provided for each floor or protected zone of the building.

2. If a wire-to-wire short occurs, the isolator module shall automatically open-circuit (disconnect) the SLC. When the short circuit condition is corrected, the isolator module shall automatically reconnect the isolated section.

3. The isolator module shall not require address-setting, and its operations shall be totally automatic. It shall not be necessary to replace or reset an isolator module after its normal operation.

4. The isolator module shall provide a single LED that shall flash to indicate that the isolator is operational and shall illuminate steadily to indicate that a short circuit condition has been detected and isolated.

2.6 BATTERIES:

A. The battery shall have sufficient capacity to power the fire alarm system for not less than twenty-four hours plus 5 minutes of alarm upon a normal AC power failure or as directed by Fire Marshal. Size batteries at 200% of calculated load.

B. The batteries are to be completely maintenance free. No liquids are required. Fluid level checks for refilling, spills, and leakage shall not be required.

C. If necessary to meet standby requirements, external battery and charger systems may be used.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. 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.

B. All conduit, junction boxes, conduit supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage. Paint all boxes red.

C. 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.

3.2 TEST:

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. All testing shall be in accordance with NFPA 72, Chapter 7.

A. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.

B. Close each sprinkler system flow valve and verify proper supervisory alarm at the FACP.

C. Verify activation of all waterflow switches.

D. Open initiating device circuits and verify that the trouble signal actuates.

E. Open and short signaling line circuits and verify that the trouble signal actuates.

F. Open and short notification appliance circuits and verify that trouble signal actuates.

G. Ground all circuits and verify response of trouble signals.

H. Check presence and audibility of tone at all alarm notification devices.

I. Check installation, supervision, and operation of all intelligent smoke detectors using the walk test.

J. 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.

K. 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.

3.3 FINAL INSPECTION:

A. 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.

3.4 INSTRUCTION:

A. 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.

B. The contractor and/or the systems manufacturer's representatives shall provide a typewritten "Sequence of Operation."

END OF SECTION 28 31 11

SECTION 31 10 00 – SITE PREPARATION

PART 1 -GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Establish clearing limits and vegetation to remain.
2. Protection of existing trees to remain. Establish clearing limits and vegetation to remain.
3. Installation and maintenance of temporary erosion control facilities through project completion.
4. Clearing site of grass, shrubs, tree stumps/root masses, and other vegetation.
5. Removal of pavements and other improvements.
6. Removal and disposal of materials from site according to regulatory requirements.
7. Protect from harm any vegetation, existing structures, utilities, pavements, sidewalks, curbs, or other objects selected to remain.

B. Drawings and general provisions of Contract, including Supplementary Conditions and Division 01 Specification Sections, apply to this section. Coordinate related work specified in other parts of the Project Manual, including but not limited to following:

1. Section 31 22 00 – Earthwork
2. Section 01 57 13 – TESC

C. References Include:

1. WSDOT-APWA Standard Specifications for Road, Bridge, and Municipal Construction, 2024.
2. Standard Plans WSDOT/APWA Standard Plans for Road, Bridge, and Municipal Construction, current edition.
3. City of North Bend Public Works Standards, June 2018.
4. Geotechnical Engineering Report prepared by Associated Earth Sciences, Inc for Two Rivers Montessori School Additions, dated April 11, 2023.

1.2 SUBMITTALS

A. General: Comply with Section 01 33 00.

1. Submit demolition procedures and operational sequence for review and acceptance by Owner.
2. Permits for transport and disposal of debris as required.

1.3 DESCRIPTION

A. Construct and maintain erosion and sedimentation control in accordance with contract documents City of North Bend requirements. Clear and grub site as indicated and as necessary to construct improvements. Save and protect from harm any trees, vegetation, or other objects selected to remain. Remove from area to be cleared all other growth unless otherwise indicated or directed by the Snoqualmie Valley School District.

1.4 EXISTING CONDITIONS

A. Protection of Existing Improvements.

1. Provide, erect, and maintain barricades, coverings, or other types of protection necessary to prevent damage to existing improvements.
2. Restore any existing improvements damaged by this work to their original condition, as acceptable to Owner.

B. Objectionable Noises: Conform with local governing requirements regarding Noise Control.

C. Maintain vehicular and pedestrian traffic routes.

D. Ensure minimum interference with roads, streets and adjacent facilities.

E. Do not close or obstruct streets, fire lanes, sidewalks, alleys or passageways without permission from authorities having jurisdiction.

F. If required by governing authorities, provide alternate routes around closed or obstructed traffic ways.

1.5 DIMENSIONS AND LAYOUTS

A. The Contractor will be responsible for furnishing, setting, and marking all line and location stakes, including offsets and general construction staking. When work requiring control is being performed, all necessary related equipment, supplies and instruments shall be on site. A qualified layout engineer, surveyor, or technical specialist must be assigned to the Contractor's crew for this work. This equipment and personnel must be available, at no additional cost to the Snoqualmie Valley School District for the purpose of verifying layout, conformance of grading design, and certifying the accuracy of work on the site.

B. The Contractor is responsible for preserving all benchmarks and stakes and the replacement of any that are displaced or missing.

C. The Contractor is responsible for review of all utility purveyor, and City or State records relative to the existing underground utilities. The Contractor is responsible for avoiding damage to these facilities and shall restore all utilities at Contractor's own expense.

D. The Contractor is to notify the Owner's Representative immediately if underground utilities not shown on the project documents are encountered.

1.6 REGULATORY REQUIREMENTS

A. Schedule the required pre-construction meeting with Mukilteo School District and Owner/Architect.

B. Comply with all applicable Federal, State, and Local codes and safety regulations. If there are any conflicts among referenced standards, the more stringent requirements shall govern.

C. Coordinate demolition work with the appropriate utility purveyors.

D. Obtain all necessary permits.

PART 2 - PRODUCTS

2.1 TEMPORARY FENCING

A. Temporary chain link fencing: minimum 6' height, line posts at 8' o.c. maximum. 2" chain link mesh fence.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin work prior to receiving Notice to Proceed from Owner.

B. Verify limits of clearing, grubbing, and site improvement removal with Owner prior to commencing work.

C. Obtain required permits and permission from local governing authorities and The Snoqualmie Valley School District prior to commencing work.

D. Prior to beginning site removals and clearing, meet with Owner's Representative and review all proposed utility layouts on site. Indicate all existing trees, shrubs, and landscaping as well as site improvements that will be affected by construction. Coordinate removals of landscape materials with Owner.

E. Provide appropriate fencing and/or barricades for safety and protection in the vicinity of the work area.

3.2 DOCUMENTATION OF UTILITIES AND CONTROLS

A. Maintain a separate drawing to be stored on-site for identifying key utilities and controls. Identify and apply color-coded markings identifying shut-offs for domestic water, irrigation water, power, and gas. Identify sanitary sewerage, stormwater discharge, gas, fiber optics, and telephone (all as appropriate) lines, which are to be

maintained in service during the work. Color-code emergency contact information for each utility directly on the drawing.

B. In accordance with Section 31 2200, identify and accurately locate all capped utilities, utilities to be abandoned in place and other subsurface piping, structural, electrical and mechanical existing improvement to remain.

3.3 GENERAL

A. Install perimeter Temporary Erosion and Sedimentation Control (TESC) measures in accordance with Section 01 5713, and flag or fence, as shown on plans, all clearing limits prior to clearing or grubbing of the site.

B. The Contractor shall note that the soils are very moisture sensitive, and the erosion potential of the site soils is high and that a significant amount of the clearing and earthwork will be conducted during wet weather. See Geotechnical Engineering Report and Section 31 2200. The Contractor shall implement means and methods necessary to execute site demolition work in accordance with the Contract requirements and project schedule.

C. The contractor shall schedule site demolition work to minimize existing soil disturbances. The Contractors ability to perform site demolition work with the existing moisture sensitive soils may be impossible during different periods of the work and may require the contractor to cease operations until some soil healing occurs. Inactive workdays or wet weather days shall be expected and planned for in the Contractor's schedule and bid without extra cost to the Owner, except in abnormal wet weather cases. Abnormal wet weather cases shall be in accordance with the General Conditions. Time delays caused by the inability to perform work in existing saturated soils shall not be a basis for additional money or time claims.

D. Prior to commencing site demolition and clearing, locate and flag all limits. Save and protect all areas to outside limits or existing improvements to remain. Contractor shall repair to equal or better condition areas outside limits impacted by Contractor's work. Prior to site clearing and demolition, contact utility location service (both public and private) and have all underground utilities on the site and adjacent right of ways clearly marked. Locate, flag, and protect existing underground utilities to remain.

E. Approximate locations of existing utilities have been obtained from available records and are shown for convenience. The contractor shall be responsible for verification of the locations shown and for discovery of possible additional utilities not shown so as to avoid damage or disturbance. The underground utility location service shall be contacted for field location prior to any construction. The Owner's Representative shall be contacted if a utility conflict exists.

F. Protect from weather existing soils exposed by site clearing and demolition activities. Protect exposed soils from erosion by covering it with straw mulch or plastic. Prevent disturbance from vehicular/construction traffic. Coordinate with TESC requirements in accordance with Section 01 5713.

G. Protect and maintain benchmarks and survey control points from disturbance during construction.

H. The Contractor shall provide temporary barricades, barriers, guard railing, shoring etc. as necessary to protect personnel, structures, and utilities to remain intact during the operation of this contract. Conduct work in such a way to prevent damage to adjacent buildings, structures, other facilities, and injury to persons. The Contractor shall clean adjacent structures and improvements of dust, dirt or debris caused by demolition and clearing operations. Any damage to existing facilities to remain or to improvements on adjacent properties shall be repaired, replaced and/or reconstructed by the Contractor at their expense to its original condition or better as directed by the Owner's Representative.

I. Conduct site demolition and clearing in such a way to ensure minimum interference with roads and other adjacent properties. Do not close or obstruct streets or other occupied or used facilities without permission from authorities having jurisdiction.

3.4 CLEARING

A. Prior to site clearing and demolition, contact utility location service and have all underground utilities on the site and adjacent right of ways clearly marked. Locate, flag, and protect existing underground utilities to remain.

B. Approximate locations of existing utilities have been obtained from available records and are shown for convenience. The contractor shall be responsible for verification of the locations shown and for discovery of possible additional utilities not shown so as to avoid damage or disturbance. The underground utility location service shall be contacted for field location prior to any construction. The Owner shall be contacted if a utility conflict exists.

C. Completely remove all roots, stumps, vegetation, and all other organic debris within the clearing limits as required for new construction and as indicated. Perform removal operations in a manner to protect property.

D. Save and protect trees indicated on plans to remain. Protect all off-site trees along adjacent roadways and on surrounding properties.

E. Do not drive heavy equipment outside of the clearing limits to perform any clearing or tree removal. Replace all fencing and TESC measures damaged by logging at no additional cost to the Owner.

F. Dispose of clearing debris off site in a legal manner. Remove all debris and litter found on-site.

3.5 GRUBBING

A. General: Grub or otherwise prepare areas where clearing has occurred to receive construction or other improvements.

B. Excavate and remove all stumps to a minimum depth of at least 2'-0" below grade.

C. Excavate and remove roots larger than 2 inches in diameter, rocks, boulders, any remaining paving, and the like, as well as other unsuitable materials.

D. Areas to be occupied by building or other construction: Excavate these materials to not less than 6” below existing or final grade whichever is lower.

E. Use only hand methods for grubbing inside the greater of a 10-foot radius or the drip line (whichever is greater) of trees indicated to remain.

F. Any stripping volumes required beyond the assumed depth listed above will be compensated for by the Owner only if documented, reviewed and measured prior to removal by the Geotechnical engineer. No additional compensation will be made for additional stripping done without Owner’s Representative and Geotechnical Engineer’s review and approval.

G. Fill depressions caused by clearing and grubbing operations as indicated for the respective areas of work in these specifications. Compact to the appropriate level indicated per Section 312200.

3.6 SITE IMPROVEMENT REMOVALS

A. Remove or abandon existing underground utilities per City of North Bend standards, below the proposed building structure, and as shown on plans, if applicable.

B. Existing underground utilities to be filled with CDF and capped in accordance with the City of North Bend Design and Construction Standards, if applicable.

C. Sprinkle excavated material and removed pavement areas as necessary to limit dust to lowest practicable level. Do not use water to the extent of causing flooding, contaminated runoff, or icing.

3.7 DRAINAGE AND GROUNDWATER

A. Review and follow the Geotechnical recommendations concerning sub-grade protection.

B. Control all surface and sub-surface water in order to prevent damage to the project site and adjacent properties. Provide all means necessary to immediately resolve surface water drainage problems generated on the construction site. Protect disturbed areas from inclement weather and surface runoff during construction process to provide a suitable working platform for all phases of the construction. Provide proper grading to prevent standing water.

C. Intercept and route upstream stormwater around the project site as applicable.

D. Keep natural drainage ways open for drainage at all times. Provide erosion control and stormwater turbidity control facilities as required according to the Plan, Section 015713, and per the City inspector to prevent sediment transport and turbid stormwater discharge either downstream or offsite. TESC facilities shall be installed prior to clearing and demolition. At no time shall more than one foot of sediment be allowed to accumulate within a catch basin, ditch, or swale. All catch basins and conveyance ditches shall be cleaned prior to paving. Mud/sediment build-up shall be removed, and the cleaning operation shall not flush sediment-laden water into the downstream system.

E. Keep open pits and holes caused as a result of demolition work free of standing water. All water shall be discharged in a stabilized manner to the site TESC system.

F. Keep all trenches, holes, and pits free of water during clearing, grubbing, excavation, construction of structures and installation of drains. Control surface run-off in order to prevent collection of water in areas not indicated to hold run-off.

G. Prior to clearing and demolition, in the event dewatering is required, submit to the Owner's Representative a statement of the method, installation, and details of the dewatering systems in accordance with Division 1. Provide, install, and operate all necessary equipment to keep excavations free from water during construction. Dewater and dispose of the water in order to not cause damage to public/private property or to cause a nuisance/menace to the public. The Contractor shall have at all times sufficient pumping equipment and machinery in good working condition for all ordinary emergencies, including power outages. Have available, at all times, competent workers for the operation of the pumping equipment.

H. Control ground water to prevent softening of the base of the excavation or formation of quick conditions or boils during excavation. Design and operate dewatering systems in order to prevent removal of natural soils and to eliminate turbidity of the discharge water.

3.8 GENERAL SITE REMOVALS

A. Remove and dispose of site walls and foundations, fences, site furnishings, stairs and foundations, landscaping, topsoil, piping, and other obstructions in areas to be cleared. Materials not designated for salvage shall be broken up, loaded, and legally disposed of by the Contractor. Care shall be taken removing items to ensure that damage does not occur to the existing trees and improvements which are to remain in place.

B. Electrical: Demolish miscellaneous electrical furnishings including but not limited to lighting, power vaults, data and communication vaults and junction boxes, underground raceways between vaults etc. in their entirety unless otherwise designated in the electrical plans and specifications. All work shall be incidental to site demolition.

C. Mechanical: Demolish all gas utility, exterior building plumbing and mechanical equipment and piping in their entirety unless otherwise designated in the mechanical plans and specifications. All work shall be incidental to site demolition.

D. Sprinkle excavated material and access roads as necessary to limit dust to the lowest practicable level. Do not use water to such an extent as to cause flooding, contaminated runoff, or icing.

E. Explosive blasting is forbidden.

3.9 PAVEMENT DEMOLITION

A. Raze, remove, and dispose of curb, concrete and asphalt pavements and appurtenances, concrete walls, concrete plaza and patios, concrete site stairs, and other Pavement removals adjacent to existing pavement to remain shall be accomplished by making a neat vertical sawcut at the limits of removal for asphalt and

to the nearest joint on concrete. All concrete walk removals shall be sawcut at the next adjacent joint. Adjacent pavement materials designated to remain that are damaged by the Contractor during the work shall be replaced at no additional cost to the Owner.

3.10 UTILITY DEMOLTION

A. Contractor shall coordinate with applicable utility owners, purveyors and Owner's Representative to provide timely completion of utility removal work to be done by others. Installation of temporary utilities may be required to accomplish the required work and shall be considered incidental to the work.

B. Locate all existing underground and above ground utilities in area of work. Save, support and protect utilities to remain. All utility piping and structures not designated for removal are to remain until new services are tested and in operation and shall be protected during construction unless indicated otherwise. Damage to existing utilities which are to remain shall be repaired immediately at the Contractor's expense. In the event the Contractor encounters utility lines not shown on the site plan or otherwise indicated to be saved, removed, or abandoned, the location of such lines shall be marked in the field and the Owner's Representative notified.

C. Locate, identify, disconnect, remove and dispose of utilities to be shown to be demolished. Arrange with utility owners and purveyors to shut off indicated utilities. Disconnect and/or remove existing utilities and/or structures as shown on plans and any additional utilities found in the construction area that conflict with improvements as part of this work.

D. Asbestos piping: This project contains asbestos cement utility piping and will be encountered during the demolition work. The existing asbestos cement piping shall be demolished or abandoned in place as necessary and in accordance with the local, State and federal regulations.

E. Storm drainage pipe demolition:

1. The Contractor shall cap the end of the storm drainage pipe to remain in place. Storm drainage pipe demolition shall be performed in the presence of the City of Mukilteo personnel (inspector). To abandon existing storm pipes, install a cured-in-place liner inside the storm drainage pipe and fill storm drainage pipe to be abandoned with controlled density fill. Removal of structures shall be completed only after the pipes have been removed or properly abandoned. Remove all utility piping as necessary to complete improvements, within the building and structure footprints, under bioretention areas and other drainage facilities, and where utility will be less than 4 feet below finished grade.

F. Abandoning Water Facilities:

1. Shall be performed in accordance with the current edition of the Mukilteo Water and Wastewater District Standards and coordinated with Water District personnel (inspector).

2. Completely remove all existing utility piping and structures within the building and structure footprints, under bioretention areas and other drainage facilities. In other areas remove all utility piping as necessary to complete improvements and where utility will be less than 4 feet below finished grade.
3. Abandon all pipes not in use but allowed to remain, unless designated otherwise on plans or in specifications, in accordance with WSDOT Section 7-08.3(4).
4. Existing site irrigation facilities are present on site. The many locations of the existing irrigation facilities are unknown. The existing irrigation system demolition work shall include but is not limited to demolishing the irrigation control valves and boxes shown on the plans and including the removal of underground piping, wiring and heads located upstream and downstream of the control valve such that no piping or wiring in the work are remaining. Where the contractor finds an existing irrigation system within the work area not designated to remain, the contractor shall coordinate with the Landscape architect for removal. It shall be anticipated that the contractor will trace and remove all piping and wiring such that no further system facilities are remaining. Capping and abandoning existing irrigation system is not allowed. Removal and demolition of the existing irrigation system work shall be incidental to the site demolition.

3.11 FILLING DEPRESSIONS

A. Fill depressions caused by clearing, grubbing, demolition and utility removal operations shall be accordance with Section 31 2200 and shall meet all criteria specified for moisture and compaction with respect to the future conditions designated for that area. The Contractor shall use caution if using common backfill materials due to their moisture sensitivity. The contractor is responsible and shall install satisfactory soil materials to accomplish the work. The demolition excavation and backfill shall be incidental to the Site Demolition work.

3.12 STRIPING REMOVALS

A. Removal of existing paint striping on existing pavement to remain shall be completed by hydro blasting or approved equal.

3.13 DISPOSAL OF MATERIALS

A. Refer to Section 01 7419 Construction Waste Management.

B. All site demolition materials shall become the Contractor’s property unless otherwise noted in the project documents.

C. The refuse resulting from site preparation shall be disposed of by the Contractor in a manner consistent with all government regulations. In no case shall refuse material be left on the project site, shoved onto abutting private properties, or be buried in embankments or trenches on the project site. Debris shall not be deposited in any stream or body of water, or in any public right-of-way or upon any private property except by written consent of the private property owner. On-site burning is not allowed. Maintain hauling routes clean and free of any debris resulting from the work of this Section.

D. The Owner encourages the salvage and recycling of materials from demolished structures. The Contractor shall salvage or recycle, in an acceptable manner to environmental agencies and the Owner, at his/her option, any of the materials designated for disposal.

E. Non-salvageable or non-recyclable demolition, contaminated soils, and creosote debris shall be transported to an approved lined landfill with a leachate collection system.

F. The Contractor has the option to secure its own demolition debris, asphalt, concrete, and creosote materials disposal or recycle site(s) provided it has acquired all permits and approvals necessary from governing agencies and the Owner.

G. The Contractor shall submit to the Owner's Representative copies of trip tickets and receiver tickets for all material transported to approved landfills and/or recyclers to ensure disposal at proper facilities. Trip tickets will not be used to quantify material.

H. Leave the project area in a neat and orderly condition to meet the approval of the Owner/Owner's Representative.

3.14 CONSTRUCTION FENCING

A. Contractor shall install construction fencing including gates as necessary to secure site. Fence shall be inspected and maintained on a regular basis.

B. Contractor shall coordinate any work outside of construction fencing with Mukilteo School District prior to performing work.

C. Secure the project site from trespassing or unintentional entrance by unauthorized personnel.

D. All disturbed ground stockpiles, staging and on-site transport routes shall be fully enclosed by a perimeter security fence. Areas either under construction or completed but not specifically accepted by the Owner's Representative as Substantially Complete shall be completely enclosed. Areas included in the Contract but not yet under construction may be left open to public access at the discretion of the Owner's Representative.

E. Temporary chain link fence panels shall be connected mechanically by means of pre-fabricated, bolted brackets manufactured specifically for the purpose. Fence panels shall not be wired together.

F. Where long straight runs result in an unstable condition, sufficient out-rigging shall be incorporated to maintain fencing upright. Use only pre-manufactured outriggers or additional fence panels. Out-riggers shall be placed on the interior side of the fence unless approved by the Owner's Representative. Alternatively, and where appropriate, a "zig-zag" arrangement of panels for stability may be used.

G. Uneven Terrain: Where uneven terrain will not allow the use of pre-manufactured portable fence panels, or where otherwise directed by the Owner's Representative, drive posts directly into the earth plumb and 8 ft on center along the approved alignment. It is the Contractor's responsibility to perform a complete locates for underground utilities in any area to receive driven posts. Drive posts to sufficient depth to assure stability and durability for the life of the installation, maintaining a minimum of 6 ft above grade. Reset loose posts at the direction of the Owner's Representative. Secure chain link fabric to posts using approved wire ties within 6 inches of the top and bottom of each post, and a minimum of 18 inches on center between. Provide posts at each end of each driven post installation at a point that is sufficiently level to clamp prefabricated portable fence panels directly to the driven post installation.

H. Where approved, temporary PVC Fencing may be installed in low-security, short term applications. Attach 4-ft wide rolls of orange PVC web fencing with wire ties to driven 6-ft #5 deformed steel reinforcing bar posts located at 5 ft on center. Cap each reinforcing bar with a safety cap manufactured for the #5 reinforcing bar.

3.15 TREE PROTECTION FENCING

A. Tree protection fencing shall be installed in accordance with the plans and coordinated with the Landscape Architect.

3.16 REMOVAL OF TREE PROTECTION AND SECURITY FENCING

A. Remove Temporary Tree Protection and Security Fencing within 2 weeks of establishment of the Contract Work as Substantially Complete. The Owner reserves the right of transfer of any rental agreement or contract for Temporary Fence installations, with the cost of eventual removal to be covered by the Contractor upon transfer.

3.17 PROTECTION OF STOCKPILES

A. Protect stockpile areas from release of sediment. Cover stockpiles at all times while not in use to keep stored material dry. Surround materials stockpiled on pavement by two rows of straw bales or compost filter sock with joints staggered.

END OF SECTION 31 10 00

SECTION 31 22 00 - EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Excavation of unsuitable material.
2. Excavating, backfilling, and compacting for structures, pavements, and landscape areas.
3. Cutting, grading, and filling (earthwork).
4. Aggregate and soil materials.
5. Protection and conditioning of on-site materials.
6. Exporting and disposing of unsuitable and excess soil material.

B. Related Sections: The following Sections contain requirements that relate to this Section.

1. Section 01 57 13 – TESC
2. Section 31 10 00 – Site Preparation
3. Section 31 41 33 – Trench Safety
4. Section 32 12 16 – Asphalt Paving
5. Section 32 13 13 – Concrete Paving
6. Section 33 40 00 – Storm Drainage

C. References:

1. WSDOT Standard Specifications Washington State Department of Transportation 2024 Standard Specifications for Road, Bridge, and Municipal Construction.
2. City of North Bend Public Works Standards, June 2018.
3. King County Surface Water Design Manual, 2021.
4. City of North Bend Clearing, Grading, Filling, and Drainage Code, Chapter 19.10.
5. Geotechnical Engineering Report prepared by Associated Earth Sciences, Inc for Two Rivers Montessori School Additions, dated April 11, 2023.

1.2 SUBMITTALS

A. General: Comply with Section 01 33 00. Samples: Shall apply to import material only. Examples include, but are not limited to, structural fill, and crushed rock base for asphalt and concrete pavement. The contractor shall provide (2) 5-gallon buckets of each import material from the supplier for delivery to or pickup by the owner’s 3rd party geotechnical engineer ten business days prior to placing material. Material will then be tested and approved or denied (at which point new samples are submitted and retested) prior to allowing the use of material to be used for construction.

B. Quality Assurance/Control Submittals: Shall include compaction and density testing reports typically prepared by the Geotechnical Engineer on record or owner's 3rd party geotechnical engineer. Civil Engineer to be copied on all Geotechnical testing reports.

C. Test Reports: Sieve analysis for each material.

D. Certificates: WSDOT or North Bend pit certification for each pit.

1.3 UNIT PRICES

A. Contractor shall include in the base bid the cost of achieving the final grades shown on the Contract Documents beginning with the existing conditions as represented in the site survey and Geotechnical report attached to, and included in, the Contract Documents. All excavation to suitable bearing soil, export, import, placement, and compaction required to achieve the final grades and completed structures shall be included in the base bid.

B. Over excavation: The unit price shall be applied to un-anticipated unsuitable soils as determined by the Owner's appointed Geotechnical Engineer encountered below the anticipated sub grade elevation. Un–anticipated unsuitable material shall be that material below the sub-grade elevation that does not meet bearing capacity requirements as defined by the field Geotechnical Engineer.

C. The Contractor shall be responsible for measuring the quantity of un-anticipated unsuitable material that is removed. The Contractor shall measure in place bank yards by field measurement that shall be observed, verified, and documented by the Geotechnical Engineer prior to backfilling with imported structural fill. The Contractor shall note that measurement by truck tickets will not be accepted.

D. The Contractor will be compensated at his bid unit price for excavation and off-site disposal of un- anticipated soils only as verified and documented by the Geotechnical Engineer in the field. No compensation will be made to the Contractor for unverified and undocumented quantities.

E. The Contractor shall include in his basic bid the cost of over excavation and disposing of an assumed quantity of this material to be shown in the bid proposal.

F. If the full assumed quantity of this over excavation is not required due to favorable site conditions, the Contractor shall credit back to the Owner the value of the un-required over excavation at his stated unit price. The contract will be reduced by Change Order accordingly.

G. If a quantity greater than the assumed quantity of over excavation is required, the Contractor shall perform this work at the unit price stated in his bid and the contract will be increased by Change Order accordingly.

H. Excavation and off-site disposal required to meet sub-grade elevations as defined in the Contract Documents, shall be included in the base bid, and shall not be compensated using unit prices.

I. If the Contractors sequencing of the Work requires stockpiling and double handling of materials, this shall be accomplished within the base bid amount at no additional cost to the Owner.

J. Excess Import: A unit price shall also be provided for import, placement and compaction of structural fill material for use in replacing over excavated un-anticipated unsuitable materials and/or as directed by the Geotechnical Engineer.

K. The Contractor will be compensated at his bid unit price for import only used in replacing over excavated un-anticipated unsuitable materials as approved, verified and documented by the Geotechnical Engineer in the field. Only import required by field determined deviations in the actual depth to competent bearing soils from that shown in the Contract Documents shall be compensated using the unit price.

L. The Contractor shall include in his basic bid the cost of such excess import of an assumed quantity at the unit price to be shown in the bid proposal.

M. If the full assumed quantity of this excess import is not required due to favorable site conditions, the Contractor shall credit back to the Owner the value of the un-required import at his stated unit price. The contract will be reduced by Change Order accordingly.

N. If a quantity greater than the assumed quantity of excess import is required, the Contractor shall perform this work at the unit price stated in his bid and the contract will be increased by Change Order accordingly.

O. All import required for fill required to achieve final grades and completed structures as defined in the Contract Documents, shall be included in the basic bid and shall not be compensated using unit prices.

P. Unauthorized Excavation and Import: The Contractor shall be responsible for all un-authorized excavation. The unit price shall not be applied to un-authorized excavation. The Snoqualmie Valley School District is not responsible for un-authorized over excavation, nor the import required to replace any unauthorized excavation unless approved by the Geotechnical Engineer.

Q. Sub Grade: For the purpose of the Contractor Bid, the following shall define the sub-grade elevations:

1. Walkways and Paving: The elevation at the bottom of the paving section.
2. Utility Trenches: The elevation of the bottom of the pipe bedding.

R. The Contractor will be compensated at his bid unit price for over-excavation beyond elevation of sub-grades noted on the drawings and off-site disposal only for soils judged unsuitable by the Geotechnical Engineer at the time of excavation. The Contractor will be compensated at his bid unit price for excess import for replacement of un-anticipated backfill.

S. Soil integrity will be influenced by the weather conditions and the Contractor's handling and protection of the material as it is removed and placed. It is the sole responsibility of the Contractor to protect soils from the elements. Material that is deemed unsuitable due to lack of protection will not be applied to the unit price. The Contractor will be responsible for removing such material and replacing with acceptable material at no additional cost to the owner.

1.4 QUALITY ASSURANCE

A. Comply with applicable provisions of the following specifications and documents:

1. WSDOT Standard Specifications Washington State Department of Transportation 2024 Standard Specifications for Road, Bridge, and Municipal Construction.
2. City of North Bend Public Works Standards, June 2018.
3. ASTM D1556-90 Test Method for Density of Soil in Place by the Sand-Cone Method.
4. ASTM C136 STD Method for Sieve Analysis of Fine and Coarse Aggregate.
5. ASTM D-422 -90 Method for Particle Size Analysis of Soils.
6. ASTM D1557-91 Test Method for Laboratory Compaction Characteristics of
7. Soil Using Modified Effort (56,000 ft-lb/cu ft).
8. ASTM D2922-91 Standard Test methods for Density of Soil and Soil-
9. Aggregate in Place by Nuclear Methods (Shallow Depth).
10. ASTM D3017-88 Standard Test methods for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
11. ASTM D698-91 Standard Test method for Moisture-Density relations of soils and soil-aggregate mixture using 5.5-lb. Rammer and 12-inch Drop.
12. ASTM D1557-78 Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-pound Rammer and 18- inch Drop.
13. AASHTO T176 Plastic Fines in Graded Aggregates and Soils by use of the Sand Equivalent Test.
14. ASTM D3017-78 Test Methods for Moisture Content of Soil and Soil-Aggregate-Place by Nuclear Methods (Shallow Depth).

B. Qualifications

1. Crew Foreman: Minimum six years' working experience and four years' experience as foreman performing similar work.
2. Regulatory Requirement.
3. All work and material shall be in accordance with WSDOT Standard Specification.
4. Comply with City of North Bend Design and Construction Standards.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stockpiling: Stockpile materials on site within clearing limits and at locations approved by Architect. The contractor shall be responsible for protecting the stockpiled material.

1. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.
2. Remove stockpile, leave area in a clean and neat condition. Grade site surface to prevent free standing surface water.
3. Comply with WSDOT Section 3-02.2(6). Contractor shall provide survey stakes for stockpiles.
4. Maintain toe of material at least 6 feet from edges of trenches and excavations. Pile so surface water is prevented from flowing into excavations. Provide free access to fire hydrants, water valves, meters; private driveways; and leave clearance to enable the free flow of storm water in gutters, conduits, and natural water courses.

1.6 PROJECT/SITE CONDITION

A. Environmental Requirements: Expose, excavate, and place existing site material only in dry weather.

B. Existing Conditions: Existing on-site material is moisture sensitive and moisture content is above optimum for compacting.

1.7 SEQUENCING AND SCHEDULING

A. Maintain drainage in areas of site to be occupied during construction.

B. Schedule work in this section to coordinate with the existing buildings abandonment and demolition and proposed building construction schedule.

1.8 DIMENSIONS AND LAYOUT

A. The Contractor will be responsible for furnishing, setting, and marking all line and location stakes, including offsets and general construction staking. When work requiring control is being performed, all necessary related equipment, supplies and instruments shall be on site. A qualified layout engineer, surveyor, or technical specialist must be assigned to the Contractor's crew for this work. This equipment and personnel must be available, at no additional cost to the Snoqualmie Valley School District for the purpose of verifying layout, conformance of grading design, and certifying the accuracy of work on the site.

B. The Contractor is responsible for preserving all benchmarks and stakes and the replacement of any that are displaced or missing.

C. The Contractor is responsible for review of all utility purveyor, and City, State, and School District records relative to the existing underground utilities. The Contractor is responsible for avoiding damage to these facilities and shall restore all utilities at Contractor's own expense.

D. The Contractor is to notify the Owner's Representative immediately if underground utilities not shown on the project documents are encountered.

1.9 MANUFACTURER'S QUALIFICATIONS

A. The Contractor shall select materials that are products of firms that are regularly engaged in the manufacture of the specified materials.

1.10 BASE BID REQUIREMENTS

A. The Contractor shall include in the base bid all costs of achieving final grades as shown on the Contract Documents including all excavation to suitable bearing soil, export, legal disposal, import, placement, compaction, and protection. The existing conditions are represented by the Project Survey and documented in the Geotechnical Report. The Geotechnical Report is included in the Project Manual for reference only. The Contractor accepts the provided information as existing condition upon commencing land disturbing clearing or earthwork activities.

B. The Contractor has the option to perform, at their own expense, a topographic survey of existing conditions and submit their survey for Owner's Review and approval for use for earthwork calculations prior to Contractor's land disturbing clearing or earthwork activities.

C. The cost of excavation and off-site disposal of material and imported fill and its placement and compaction required to meet sub-grade elevations as defined in the Contract Documents shall be included in the base bid amount and shall not be compensated using unit prices. In the base bid it should not be assumed that the on-site soils may be used structural fill or fill in landscape areas.

D. Subgrade: For the purpose of the Contractor Bid, the following shall define the required base bid subgrade elevations after stripping:

1. Footings: The elevation at the bottom of the footings or the elevation of the required over-excavation below footings as noted on the plans, whichever is deeper.
2. Building Slab: Two (2) feet below the capillary break elevation.
3. Paving: The elevation of bottom of paving section, including the aggregate base.
4. Utilities Trenches: The elevation of the bottom of pipe bedding.
5. Landscape: The elevation below the stripping depth or the soil planting.

E. If the Contractor's sequencing of the Work includes stock piling and double handling of materials, it shall be included within the base bid amount and shall be at no additional cost to the Owner.

F. Note per geotechnical investigation that the onsite soils are moisture sensitive and will likely be impossible to work with or utilize during periods of wet weather. The soil integrity will be influenced by weather conditions and by the Contractor's sequencing, handling and protection of the material. It is the sole responsibility of the Contractor to protect the soils from wet weather conditions, and/or disturbance from construction activities. The Contractor shall review and follow recommendation as outlined in the geotechnical report for subgrade protection and wet weather considerations. Failure by the Contractor to do so shall not be compensated using Unit Prices.

G. The Contractor shall be solely responsible for all unauthorized excavation and import and shall be at no additional cost to the Owner. The Unit Price shall not be applied to unauthorized excavation or import. Unauthorized excavations shall be backfilled with structural fill and compacted as required.

H. Removal, disposal, and placement of soils deemed unsuitable as a result of the Contractor's sequencing, handling and protection of the materials will not be compensated using unit prices.

1.11 UNIT PRICES

A. Refer to Section 01 2200 - Unit Prices for unit prices processes and procedures.

B. Refer to Section 00 4322 - Schedule of Unit Prices for over-excavation and off-site disposal of un-anticipated unsuitable soils and imported structural fill to replace un-anticipated over-excavated materials.

C. Contractor shall notify the Architect, Owner, and Testing Agency/Geotechnical engineer when work designated as a unit price is to be performed. No work associated with the unit price shall be performed until direction to proceed is received from the Owner's representative. Measurement of material shall be as specified in these specifications and shall be completed prior to work being covered. Contractor shall not receive credit or payment for work designated as a unit price if the Contractor fails to properly facilitate measurement of materials.

D. The Contractor shall be compensated at their bid unit price per Division 1 only as verified and documented by Owner's testing agency or Geotechnical Engineer in the field. All work must be pre-approved in writing by the Owner's representative. No compensation will be made to the Contractor for unverified and undocumented quantities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Utility Trench, Vaults, and Storm System Backfill: shall be Gravel Borrow in accordance with Section 9-03.14(1) of the WSDOT Standard Specifications. Within the ROW, utility trench backfill shall be in accordance with the City of North Bend Public Works Standards. Native material is not allowed to be reused as backfill. Remove native material from the site if it does not meet the requirements for use elsewhere on site.

B. Crushed Surfacing Top Course: shall be manufactured from ledge rock, talus or gravel and shall be 5/8" minus for top course. Crushed surfacing top course shall conform to the gradations of Section 9-03.9(3) of the WSDOT Standard Specifications.

C. Crushed Surfacing Base Course: shall be manufactured from ledge rock, talus or gravel and shall be 1 1/4" minus for base course. Crushed surfacing base course shall conform to the gradations of Section 9-03.9(3) of the WSDOT Standard Specifications.

D. Structural Fill: All fill placed under footings, slab on grade floor, roadways, sidewalks, walkways, behind walls, including utility trench backfill beneath these areas, and all other paved areas shall be “structural fill” as defined herein, unless specified otherwise for particular applications. Structural fill shall be imported material that conforms to the grading requirements of Gravel Borrow, Section 9-03.14(1) of the WSDOT Standard Specifications. The contractor shall assume that all structural fill is to be imported structural fill.

1. During the dry season (May 1 – September 30) shall be an imported well-graded sand and gravel material free of organic material, debris and other deleterious material, meeting the requirements of WSDOT Standard Specifications section 9-03.14(2) for “Select Borrow” modified such that 100 percent passes the 4-inch-square sieve.
2. During the rainy season (October 1 – April 30), structural fill shall be washed crushed rock or select granular fill consisting of well-graded sand and gravel or crushed rock free of organic material, debris and other deleterious material meeting the requirements of WSDOT Standard Specifications section 9-03.14(1) for “Gravel Borrow”, with the added requirement that no more than 5 percent passing the U.S. Standard No. 200 sieve.
3. Structural Fill should be placed in horizontal lifts. The Structural Fill must measure 8 to 10 inches in loose thickness and be thoroughly compacted. All Structural Fill placed under load bearing areas should be compacted to at least 95 percent of the maximum dry density, as determined using test method ASTM D1557. The top of the compacted Structural Fill should extend outside all foundations and other structural improvements a minimum distance equal to the thickness of the fill. We recommend that compaction be tested after placement of each lift in the fill pad.
4. The Contractor shall use best management practices to protect soils during construction and shall be familiar with wet weather and winter soil work.

E. Pipe Bedding shall be as follows:

1. Storm solid wall pipe bedding shall be Gravel Backfill for Pipe Zone Bedding in accordance with WSDOT Section 9-03.12(3).
2. Perforated drainpipe bedding shall be Gravel Backfill for Drains in conformance with WSDOT 9-03.12(4).

F. Gravel Backfill for Drains shall be in accordance with WSDOT 9-03.12(4).

G. Washed Rock shall be in accordance with Gravel Backfill for Drains.

H. Common Borrow: Common Borrow material shall consist of on-site excavated soils free of organic and deleterious or objectionable material and of such size and gradation that the specified compaction can be readily attained. Maximum particle size shall not exceed 6-inches. The moisture of Common Borrow material at the time of placement shall be within a range of two percent of the optimum moisture content for compaction. If on-site soils are generated at a moisture content above optimum for compaction, they shall be moisture conditioned before being considered for re-use. Common Borrow shall at meet the requirements of WSDOT Section 9-03.14(3) except that the percent by weight passing the U.S. 200 sieve shall be less than 35 percent unless authorized for use by Owner's Representative. Common Borrow shall not be used for earthwork activities during periods of wet weather.

I. Gravel Borrow: per WSDOT Section 9-03.14(1) except that the percent by weight passing the U.S. No, 200 sieve shall not exceed 5 percent.

J. Quarry Spalls: Quarry Spalls shall be in accordance with WSDOT Section 9-13.1(5) except maximum size shall be as noted on Plans.

K. Ballast: Ballast rock shall be in accordance with WSDOT Section 9-03.9(1).

2.2 APPROVAL OF FILL MATERIAL

A. All material which is proposed to be used as structural fill and backfill shall be graded and tested for moisture content and compatibility. Gradation and test results shall be submitted for review and approved by the Testing Agency prior to placement.

B. Controlled Density Fill (CDF): CDF Shall be in accordance with Section 2-09.3(1)E of the WSDOT Standard Specifications.

2.3 CAPILLARY BREAK

A. Capillary break material shall be clean crushed washed 3/4" gravel aggregate per WDOT Standard specification 9-03.12(4) modified such that material shall be a washed angular crushed rock, with less than 3 percent passing the US No. 200 sieve. Round stone or pea gravel is not acceptable.

2.4 IMPERVIOUS LINER (FOR STORMWATER DETENTION SYSTEM)

A. 30 mil PVC geomembrane liner between two layers of non-woven Tencate Mirafi 180N (or equal) per recommendation from the Rain Vault detention system manufacturer.

2.5 FILTER FABRIC

A. Filter fabric indicated in drainage applications shall be Non-woven Mirafi 140N or approved equal, unless otherwise noted on plans.

B. Filter fabric under gravel working pads should be Mirafi 500X or approved equal, unless otherwise noted on the plans.

C. Filter fabric at stormwater detention systems should be per the manufacturer recommendation: TENCATE MIRAFI 180N non-woven geotextile (or equal).

2.6 SOURCE QUALITY CONTROL

A. Tests and Inspection: Provide sieve analysis per ASTM D422 for each material type. Tests and analysis of aggregate material will be performed in accordance with WSDOT Standard Specifications. If tests indicate materials do not meet specified requirements, change material and retest.

2.7 CONDUCTIVE WARNING TAPE

A. Conductive warning tape is required over all pipes and shall be located 12-inches below the proposed finished subgrade. Tape shall be manufacturer's standard permanent, bright-colored, continuous printed plastic tape, aluminum backed, intended for direct-burial service. Tape shall be not less than 6" wide x 4 mils thick. Tape Schedule:

Piping	**Color**	**Wording**
Storm Drain	Green	Caution Storm Sewer

PART 3 – EXECUTION

3.1 GENERAL

A. All earthwork shall conform to the Washington Administrative Code (WAC) 296-155 requirements for Excavation, Trenching and Shoring.

B. Supplemental to these requirements the Contractor shall note that THE EXISTING SITE SOILS ARE MOISTURE SENSITIVE AND THE EROSION POTENTIAL OF THE SITE SOILS IS HIGH. See Geotechnical Engineering Report. The Contractor shall expect to perform site earthwork during the spring, summer, fall, and winter months. The Contractor shall not assume that the on-site soils are suitable for re-use during wet weather conditions. The Contractor shall implement means and methods necessary to

execute earthwork in accordance with the Contract requirements and project schedule. The Contractor shall execute earthwork to minimize existing soil disturbances. Inactive workdays or wet weather days shall be expected and planned for in the Contractor's schedule and bid without extra cost to the Owner, except in abnormal wet weather cases. Abnormal wet weather cases shall be in accordance with the General Conditions. Time delays caused by the inability to perform work in existing saturated soils shall not be a basis for additional money or time claims.

C. Permits:

1. The Contractor is responsible for obtaining permits required for work within the right of way.

3.2 SAFETY MONITORING AND RESPONSE

A. Maintain conformance to the Contractor's Health and Safety Plan.

3.3 PROTECTION OF EXISTING FACILITIES

A. Utilities:

1. The Contractor shall protect from damage private and public utilities in accordance with WSDOT Section 1-07.17. Contractor shall, before excavation begins, call the Utilities Underground Location Center 1-800-424-5555. The Contractor shall pay for location of existing utilities.
2. The Contractor shall, at their own expense, make excavations and borings ahead of the work, as necessary, to determine the exact location of utilities and underground structures.
3. It is understood that there will be interfering utilities, service laterals and other underground pipes, drains, or structures encountered that are not shown or areas shown incorrectly on the plans or have not been previously discovered in the field. The Contractor agrees this is a normal and usual occurrence in the construction of underground improvements. Furthermore, Contractor understands and agrees that work in some cases must be done in close proximity to said utilities and underground pipes, drains, and structures not shown or shown incorrectly on the plans which may require a change in operations and may cause sloughing of the trench, additional traffic control, additional pavement and backfill costs and time. The Contractor agrees that these occurrences are usual and ordinary and are reflected in the Bid and plan of operation.

B. Pavement: The Contractor shall protect from damage all pavement or paved areas including curbs intended to remain. Contractor shall be responsible for replacement if damage occurs to pavement or curbs to remain:

1. Access Streets and Roadways: Provide wheel cleaning stations per Section 31 1000.
2. Repair and/or replacement of damaged facilities will be accomplished at the Contractor's expense.

3. Dust Control: Per Section 31 1000.

3.4 PROTECTION OF WORK IN PROGRESS

A. It is the responsibility of the Contractor to protect all work in progress from damage due to extremes of cold, moisture, or drying, or mechanical damage from equipment traffic or foot traffic. Alert the Owner's Representative to the presence or likelihood of conditions that may adversely affect the quality of the work, the physical structure of soils, or transport of site soils off-site.

B. Do not work frozen soils.

C. Protect soils from excessive moisture. See Geotechnical Report recommendations. During periods of prolonged precipitation, take aggressive steps to avoid over-saturation, erosion, or homogenization of soils by covering with protective plastic sheeting, collection and controlled dewatering, detention for sediment removal, and not disturbing wet soils. It shall be the Contractor's sole responsibility to manage soils that are too wet or too dry for use.

D. Protect foundation subgrades as necessary from foot and equipment traffic and ponding of water during wet weather conditions. Typical measures of protection include compacted crushed rock, or a lean-mix concrete mat placed over a properly prepared subgrade. The Contractor should place foundation concrete and backfill excavations as soon as possible to protect the bearing surface.

E. Apply supplemental moisture to overly dry soils, but not to the extent that would cause runoff, puddling, or erosion.

F. Do not operate heavy equipment near excavations where trench wall or slope failure may result.

3.5 SITE GRADING

A. Required contours and elevations are shown on the Drawings; if indicated information conflicts with actual conditions, notify Owner's Representative and obtain direction before proceeding with grading of area in conflict.

B. In areas to be graded, remove trees as indicated in plans, brush, and other deleterious material.

C. Remove organic topsoil and stockpile and grub any remaining roots in accordance with Section 31 1000.

D. Provide subgrades required for various backfill soils and soil amendments as shown on Plans and Details.

E. Following clearing, grubbing, stripping, excavations to reach subgrade and prior to placement of any fill, the exposed subgrade in areas to be occupied by paving, or structures shall be proof rolled and compacted to a dense, unyielding condition with a loaded dump truck, large vibrating roller or equivalent. Site clearing, proof rolling and compacting shall be observed by the Geotechnical Engineer to identify soft spots or unsuitable material. Overexcavate per the Geotechnical Engineer's recommendations areas that cannot be reworked and/or compacted. Replace overexcavated material with imported structural fill unless otherwise directed.

F. Unless otherwise approved or not recommended during winter construction by the Geotechnical Engineer, scarify soils surfaces to receive compacted fill to a depth of at least eight (8) inches. Moisture condition scarified soil to obtain moisture to near optimum moisture content. Compact scarified soils to a minimum relative compaction as listed in this section.

G. Place fill in controlled layers in thicknesses that are compatible with the type of equipment being used. Do not exceed a loose thickness of eight (8) inches for each fill layer. Compact each layer to a minimum relative compaction as listed in this Section. Determine the field density of the compacted soils by the ASTM D2922 and D3017 test method.

H. All areas to receive compacted fill shall be field reviewed and tested by Geotechnical Engineer prior to the placement of new fill.

I. Fill soils shall be granular and shall meet the specifications graduation requirements. The testing agency shall evaluate and/or test material for its conformance with specification prior to delivery to site. The Contractor shall notify the Geotechnical Engineer 72 hours (three working days) prior to importing fill to the site.

J. The Geotechnical Engineer shall observe the placement of compacted fills and conduct in place field density tests on the compacted material to check for adequate moisture content and required relative compaction. Where less than required relative compaction or inadequate moisture is indicated, remove and replace the substandard fill or apply additional compaction effort and moisture conditioning as necessary until relative compaction, as specified in this section, is achieved. Additional testing (re-testing) is at the Contractor's own expense.

K. Provide a level testing pad for Geotechnical Engineer's field density tests.

L. The Contractor shall always grade the site and control drainage to prevent water from ponding in construction areas and/or flowing into excavations. Exposed grades shall be crowned, sloped, and smooth drum-rolled at the end of each day to facilitate drainage. Accumulated water must be removed from subgrades and work areas immediately prior to performing further work in the area. Soil deemed unfit due to the Contractor's inattention to drainage or lack of soil protection shall be replaced with imported structural fill at the Contractor's own expense.

M. Perched ground water could be encountered in excavations completed during construction. See Geotechnical Engineering Report. The Contractor shall be prepared to intercept any ground water seepage entering the excavations and route it to a suitable discharge location.

N. Slope prepared surfaces to have positive drainage and direct flows to TESC facilities.

O. Refer to Tree Protection in the Drawings and specifications for grading in the vicinity of trees to be protected.

3.6 SLOPES

A. The Contractor is responsible for the stability and safety of all temporary slopes. Refer to Geotechnical Engineering Report for guidance regarding maximum recommended temporary and permanent slopes on site.

3.7 PREPARATION

A. Subgrade preparation and protection shall be per Section 2-06 of WSDOT, except the Contractor shall perform all staking.

3.8 EXCAVATION, EMBANKMENT AND BACKFILLING

A. General:

1. Exercise sound engineering and construction practices for excavations and trenches. Maintain trenches such that no damage will occur to any foundation, structure, pole, utility or other facility due to sloughs or any other cause. If because of trenching operations, there is disturbance of the ground which may endanger or damage other property and require repair, the Contractor shall take remedial action at no additional expense to the Owner.
2. Provide dewatering, shoring and other types of stabilization, in addition to shoring required for Safety by State codes to maintain the integrity of the trench or excavation and protect adjacent utilities or structures. All earthwork activities shall conform to the Washington Administrative Code (WAC) 296-155 requirements for excavation, trenching and Shoring.

B. Excavation Material:

1. Common Excavation: The naturally occurring sand, gravel, clays, or mixtures of the above, required to be moved for the construction of roadways and for the establishment of proposed site grades. Common excavation material shall be moved with the use of mechanical equipment, such as shovels, loaders, bulldozers, graders, rippers, etc., but shall not require drilling and blasting or drilling and line breaking. Excavation by sluicing method will not be permitted.

2. Unsuitable Excavation: Shall consist of unstable materials, such as topsoil, peat, muck, water-impregnated clays, yielding or wet soils, swampy or other undesirable materials, including buried logs, stumps, abandoned utility and product delivery lines, or trash. Excavated material shall be replaced with Structural Fill.
3. Unsuitable materials beneath structures, roadways, or embankments shall be removed to the depth designated by the Owner's Representative and backfilled with Structural Fill.

C. Catch basins, manholes and similar structures: Excavate to a distance necessary to allow required soil compaction between sides of excavation and outer surfaces of structure. Take care to excavate to exact depths required; fill over excavation with compacted backfill for utility trenches.

D. Trench Excavation, Bedding and Backfill for Storm Drains:

1. Trench excavation, foundation bedding, and backfill for Storm Drains shall be in accordance with this Section, WSDOT Section 7-08.3(1) and City of North Bend Standards.
2. Backfilling of trenches in the vicinity of structures shall not take place until the cement in the masonry has become thoroughly hardened. Walking on the pipe shall not be allowed until at least one foot of earth has been placed upon it.
3. Backfill shall be in accordance with the plans and WSDOT Section 7-08.3(3) of with the following exception: In-place density will be determined by ASTM D6938-17a - Test for Density of Soil in-place by the nuclear method.
4. Trench dams shall be installed as required to prevent stormwater from utilizing the trench backfill and bedding as a conduit.

E. Catch basins, manholes and similar structures:

1. Excavate to furnish a minimum of 12 inches between sides of excavation and outer surfaces of structure. Take care to excavate to exact depths required; fill over excavation with compacted backfill for utility trenches.
2. Excavation and backfill shall be in accordance with WSDOT Section 2-09 and City of North Bend Standards unless otherwise noted in the Project Documents.

F. Structural Fill:

1. Placement of structural fill shall be in accordance with project's Geotechnical Report.

G. Moisture Conditioning and Temporary Stockpiling:

1. Where the Contractor excavates material which is over the allowable range of moisture content for placement as fill, the Contractor shall condition the material, before considering for re-use, to allow placement as common borrow. Excavated material considered for reuse must be evaluated by the Geotechnical Engineer prior to using as common fill.

2. The Contractor shall stockpile excavated material when no fill material is required at the time of excavation. The Contractor shall be responsible for preventing the stockpiled material from becoming saturated beyond the critical moisture limits for fill placement.
3. Stockpiled selected material, which becomes saturated beyond allowable limits for placement as fill, shall be removed and disposed of and replaced with Gravel Borrow or Structural fill, as appropriate for the intended use and weather conditions during installation at the expense of the Contractor.

3.9 DISPOSAL OF EARTH MATERIALS

A. The Contractor shall remove all excavated material that is not acceptable for use as fill on site. Legally dispose of excess material off site, at Contractor's expense.

3.10 FIELD QUALITY CONTROL

A. General: Control soil compaction during construction providing minimum percentage of density specified for area classification. In landscape areas, do not allow equipment traffic to overly compact areas beyond specified percentages. Remediate over-compaction as directed by the Engineer including ripping, re-grading and re-compaction or over-excavation and in-kind replacement per plan.

B. Percentage of Maximum Density Requirements: Compact soil to not less than the percentages below for maximum density for soils which exhibit a well-defined moisture density relationship determined in accordance with ASTM D1557; and not less than the following percentages of relative density.

C. Compaction:

1. Compact all fill and backfill to prevent subsequent settlement.
2. Water settling or jetting will not be permitted as a means of compaction.
3. Furnish heavy rollers or compactors except as follows:
    a. Use pneumatic hand tampers for trenches and areas not accessible to heavy equipment.
    b. Compact areas within 3-feet of footings, foundations and walls with hand equipment.

4. Required compaction: Compact fill and backfill to the following minimum relative compaction (percentage of maximum dry density determined in accordance with ASTM D1557).

Locations	Required Minimum Relative Compaction
Utility Trenches: (under non roadway and greater than 2 feet below surface below walks and roadways)	90%*
Utility Trenches: (under foundation slabs, roadways, or within 2 feet of the surface below walks and roadways)	95%
Under Slabs on Grade and Foundations	95%
Under Sidewalks and Pedestrian Plaza Pavement	95%
Retaining Wall Subgrade	95%
Within 3-feet of Back of Retaining Walls	90%
Subgrade in Planting and Landscape areas	90%
Subgrade in lawn areas	90%
Structural fill	95%
Fills on slopes steeper than 3:1	95%
Fire lanes and vehicular drive lanes	95%

* Firm and unyielding suitable for support of construction equipment per Geotechnical Engineer is acceptable.

3.11 Moisture Control

A. Before compaction, moisten or aerate each layer as necessary to provide optimum content. Compact each layer to required percentages of maximum dry density or relative dry density for each area classification.

B. Do not perform compaction operations on excessively wet soils.

3.12 DISPOSAL OF EXCESS AND/OR WASTE MATERIALS:

A. Remove from the Owner's property, all waste materials, including unacceptable excavated material as determined by the Owner’s Representative, trash and debris, and dispose of it off site in a legal and timely manner. Provide dump receipts from an approved dump site if directed.

END OF SECTION 31 22 00

SECTION 31 41 33 – TRENCH SAFETY

PART 1 – GENERAL

1.1 SUMMARY

A. This section specifies requirements for the safety systems to be used in all excavation activities, including but not limited to storm, electrical trench, and structure excavation, and excavation for grading, pavements, and landscape areas.

1.2 RELATED SECTIONS

A. Coordinate related work specified in other parts of the Project Manual, including but not limited to the following:

1. Section 31 10 00 – Site Preparation
2. Section 31 22 00 – Earthwork
3. Section 33 40 00 – Storm Drainage

1.3 REFERENCES

A. R.C.W. Chapter 49.17 WISHA.

B. WAC 296-155 Safety Standards for Construction Work.

C. WAC 296-155-660.

D. R.C.W. Chapter 39.04.180 Public Works/Trench Excavations - Safety Systems Required.

E. City of North Bend Public Works Standards, June 2018.

F. King County Surface Water Design Manual, 2021.

G. City of North Bend Clearing, Grading, Filling, and Drainage Code, Chapter 19.10.

H. WSDOT - Standard Specifications for Road, Bridge and Municipal Construction, latest edition; Washington State Department of Transportation. Standard Plans, current edition.

I. Geotechnical Engineering Report prepared by Associated Earth Sciences, Inc for Two Rivers Montessori School Additions, dated April 11, 2023.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 EXCAVATION SAFETY SYSTEMS

A. Protect all excavation in excess of four-feet in depth with a safety system conforming to the referenced requirements.

B. The Contractor's excavation safety system shall be designed by a qualified person and meet the referenced requirements.

C. All excavation not requiring trench safety systems shall also meet the WISHA safety standards and the requirements of Section 31 22 00, Earthwork.

END OF SECTION 31 41 33

SECTION 32 12 16 – ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections.

B. Designs and Specifications for Asphalt Concrete Pavements and Bases by Asphalt Paving Association of Washington.

C. Washington State Department of Transportation (WSDOT)/American Public Works Association 2024 Standard Specifications for Road, Bridge, and Municipal Construction.

D. City of North Bend Public Works Standards, June 2018.

E. City of North Bend Clearing, Grading, Filling, and Drainage Code, Chapter 19.10.

F. Geotechnical Engineering Report prepared by Associated Earth Sciences, Inc for Two Rivers Montessori School Additions, dated April 11, 2023.

1.2 PRE-APPROVED PLANS:

A. This Section incorporates by reference the latest revisions of the following documents. They are part of this section insofar as specified and modified herein. The Contractor shall have one copy of each of the following documents at the job site. The bidder in submitting a bid acknowledges that he is familiar with the documents named in References and that they are incorporated into this document by reference. The Standard Plans and Policies apply only to performance and materials and how they are to be incorporated into the work. The legal/contractual relationship sections and the measurements and payment sections do not apply to this document.

B. Pre-Approved Plans:

1. WSDOT-APWA WSDOT Standard Specifications Washington State Department of Transportation 2024 Standard Specifications for Road, Bridge, and Municipal Construction.

1.3 SUBMITTALS

A. General: Submit in accordance with Section 01 33 00.

B. Asphalt Mix: Submit proposed job-mix formula for the bituminous mixture, or certificate showing compliance with specifications.

C. Certificates: Submit manufacturer's certification that concrete mix, bituminous materials, aggregate base, and herbicide comply with specification requirements; include laboratory, compaction, and slump test reports verifying compliance, if requested.

1.4 QUALITY ASSURANCE

A. Layout and Dimensions shall be in conformance with Section 31 22 00 Earthwork.

B. Qualifications: Work is subject to the following qualifications.

C. Producer/Installer: Provide materials produced by bulk asphalt concrete producer regularly engaged in the production of hot-mix, hot-laid asphalt concrete. Installer must be experienced in the installation of Asphaltic concrete paving with adequate plant, equipment, and personnel for the completion of the work.

D. Provide materials produced by cement concrete producer regularly engaged in the production of concrete paving mix. Installer must be experienced in the installation of cement concrete paving with adequate equipment and personnel for the completion of the work.

E. Materials: Provide fresh new materials meeting or exceeding requirements specified herein.

F. Allowable Tolerances: Surface Smoothness shall be in accordance with Section 5-04.3(13) of the Standard Specifications.

G. Testing: Contractor will furnish material testing and inspection for quality control during paving operations. Paving thickness is subject to core tests upon completion. Should average thickness be less than specified, apply more paving to furnish specified thickness as a minimum. Patch all core drill holes.

H. Testing: Pavement shall be tested for proper thickness and proper drainage as specified in this section.

1.5 PROJECT SITE

A. Existing Conditions: Where paving interferes with the completion of the work, cut out and dispose of at Contractor's expense. Upon completion of the Work, patch all such damaged pavement to match adjacent existing paving.

B. Environmental Conditions: Apply asphalt concrete surface course only when atmospheric temperature is more than 45-deg. F., when underlying base is dry, and when weather is not rainy or damp. Aggregate base course material may be applied when air temperature is not below 30-deg. F. and rising, if approved by Architect.

C. Environmental Conditions: Do no work when base or earth sub-grade is wet or contains an excess amount of moisture.

1. Protection & Controls:

a. Grade Control: Establish and maintain the required lines and grades, including crown and cross slopes, for each course of paving until completion and acceptance of the Work.

b. Traffic Control: Maintain vehicular and pedestrian traffic lanes during paving operations as required for other construction activities and for access to the existing building and facilities. The Contractor shall be responsible for the protection of the new paving against vehicular traffic prior to and for a minimum of 48 hours following any required seal coat operation.

PART 2 - PRODUCTS

2.1 SOIL STERILANT

A. Herbicide shall be an EPA approved dry, free-flowing, dust-free chemical compound which is non-flammable, non-poisonous and non-corrosive. The chemical shall be a chlorate-borate compound, such as polybor-chlorate and 68 percent sodium metaborate or 73 percent disodium octaborate, suitable for application in powder form or in a solution.

2.2 HEADERS, BENDERS & STAKES

A. Construction Grade Douglas fir; preservative treated.

2.3 ASPHALT CONCRETE

A. Asphalt concrete shall be composed of asphalt and aggregate which, with or without the addition of mineral filler and blending sand as may be required, shall be mixed in the proportions specified to provide a homogenous, stable and workable mixture.

B. Asphalt concrete shall be HMA Class ½" conforming to WSDOT Section 9-03.8(6).

2.4 CRACK FILLER

A. Flexafil rubberized asphalt, or equal.

2.5 TACK COAT

A. Tack coat of asphalt shall have 0.05 to 0.08 gallons of retained asphalt per square yard of application and be in accordance with WSDOT 5-04.3(4).

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Remove all existing fill, debris, vegetation, and other perishable materials from areas to be paved. Proof roll subgrade and address soft yielding areas per Engineers recommendation. Bring areas requiring fills to rough grade elevations. Install wood headers and benders to true lines as indicated and securely staked to prevent movement or displacement during paving operations. Remove upon completion. Apply sterilant to subgrades in strict accordance with manufacturer's recommendations.

B. Base Course: Place in accordance with the requirements of WSDOT Standard Specification Section 4-04 and to the thickness shown on the plan or to match existing depth, whichever is greater. Materials shall be graded and compacted in 4-inch maximum layers to at least 98 percent of maximum density in accordance with ASTM D1557, Method D.

C. Asphalt treated base, place, spread, finish and compact in conformance with Standard Specification, Section 4-06 and to the thickness shown on the plans.

3.2 PAVING INSTALLATION

A. Tack Coat: All contact surfaces, curbs and cold pavement joints shall be painted with asphalt emulsion before the surfacing is laid. All longitudinal and transverse joints shall be fully compressed by the spreading machine and be free from surface irregularities.

B. Asphalt Concrete Paving: Provide asphalt concrete, HMA Class ½” as indicated on the plans, consisting of mineral aggregate, uniformly mixed with bituminous material in a central plant. Provide all labor, equipment and materials required to complete the work. All asphalt concrete pavement work shall conform to the requirements of Section 5-04.3 of the WSDOT Standard Specifications.

C. Place asphalt in accordance with Section 5-04 of WSDOT-APWA. Spread, finish, and compact in accordance with Sections 5-04.3(9) and 5-04.3(10).

D. Construct joints in accordance with Section 5-04.3(12). Provide surface smoothness in accordance with Section 5-04.3(13).

E. Accomplish paving in accordance with the weather limitations outlined in Section 5-04.3(1).

F. Sample and test asphalt concrete in accordance with Sections 5-04.3(10).

G. The completed surface of the wearing course shall not vary more than 1/4 inch in 10 feet from the rate of slope shown in project plans. Depressions exceeding 1/4" shall be corrected.

3.3 PAVEMENT PATCHING

A. Patching Bituminous Pavement: Replace the existing pavement with HMA Class ½" asphalt concrete pavement and compacted aggregate base course to the same thickness as the existing "ACP" and base, except the minimum replacement pavement section shall be 2 inches of "ACP" on 6 inches of compacted aggregate base.

END OF SECTION 32 12 16

SECTION 32 13 13 – CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Provide cement concrete sidewalks and concrete paving as shown on the Contract Documents.
2. Aggregate and soil materials.
3. Protection and conditioning of on-site materials.
4. Exporting and disposing of unsuitable and excess soil material.

B. Related Sections: The following Sections contain requirements that relate to this Section.

1. Section 31 22 00 – Earthwork

C. References

1. WSDOT Standard Specifications Washington State Department of Transportation 2024 Standard Specifications for Road, Bridge, and Municipal Construction.
2. City of North Bend Public Works Standards, June 2018.
3. City of North Bend Clearing, Grading, Filling, and Drainage Code, Chapter 19.10.
4. Geotechnical Engineering Report prepared by Associated Earth Sciences, Inc for Two Rivers Montessori School Additions, dated April 11, 2023.

1.2 SUBMITTALS

A. Comply with Section 01 33 00.

B. Submit product data and manufacturer’s instructions for:

1. Concrete mix design for all surfaces, noting where mix designs to be used on the project site.
2. Admixtures.
3. Joint Sealants.

C. Concrete joints shall match existing layout. Coordinate with architect and owner prior to starting construction.

PART 2 - PRODUCTS

2.1 CEMENT CONCRETE PAVING AND SIDEWALKS

A. Construct cement concrete sidewalks and integral curb and sidewalks and ADA ramps with air entrained concrete Class 3000 conforming to the requirements of WSDOT-APWA Sec. 6-02. Portland cement, aggregates, joint filler and curing materials shall conform to Section 8-14.2 of WSDOT-APWA. Calcium Chloride is not allowed as an admixture.

2.2 BASE COURSE

A. Base course shall be in accordance with the drawings and WSDOT Section 9-03.9(3).

2.3 EXPANSION JOINTS

A. Expansion joint material shall be pre-molded saturated felt 3/16” thick extending full width and depth of joint.

B. Expansion joints shall be placed to align with scoring pattern.

C. Expansion joints in the ROW shall conform to City of North Bend Standards.

2.4 CONTROL JOINTS

A. Control joints or tooled score joints intervals shall mimic existing patterns. On straight work, the joints shall be parallel with and at right angles to the line of the work. The markings shall be made with jointer tools that will round the edges of the scoring line to the radius of ½ “, with a depth of not less than ½”. The finishing joint opening shall not be wider than 1/8”. Provide straight, smooth 1-1/2” troweled finish on both sides of the control joints.

2.5 JOINT SEALANT

A. Joint sealant shall conform to WSDOT Section 9-04.2(2).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes your acceptance of conditions.

1. Verify proper compaction of subgrade, Section 31 22 00, for on-grade work.

3.2 PREPARATION

A. Field Measurements:

1. Verify existing dimensions and shapes. Allow for transitions to existing grades where shown on Plans.

3.3 INSTALLATION

A. Cement concrete sidewalks and walkways shall be installed in accordance with the plan drawings and WSDOT-APWA Section 8-14. Expansion joints shall be provided at a maximum 15-foot spacing and shall be coordinated with the Architectural scoring pattern. Sidewalks paving shall be divided to match existing scoring pattern, by scoring 1/4 inch deep. Sidewalks and walkways shall be broom finished. Sidewalks and walkways shall be installed flush with adjacent walks. Sidewalks shall be sloped away from adjacent buildings.

3.4 DEFECTIVE WORK

A. Remove and replace defective work not conforming to the plans and specifications to specified tolerances at the Contractor own expense.

B. Remove and replace, as directed, any sidewalks or walkways that show excessive cracking, and which do not freely drain, at the Contractors own expense.

3.5 CLEANING

A. Leave premises clean and free of residue of work of this Section.

END OF SECTION 32 13 13

SECTION 32 17 23 – EXTERIOR IMPROVEMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies the work necessary for painting Pavement Markings on the finished pavement at locations as shown on the drawings.

1.2 RELATED DOCUMENTS

A. This section references the latest revisions of the following documents. They are a part of this section as specified and modified. In case of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

1. WSDOT Standard Specifications Washington State Department of Transportation 2024 Standard Specifications for Road, Bridge, and Municipal Construction.
2. City of North Bend Public Works Standards, June 2018.
3. Manual On Uniform Traffic Control Devices (MUTCD) as currently adopted by the State Department of Transportation.
4. Federal Specification TT-P-115, Traffic Paint.

1.3 DIMENSIONS AND LAYOUTS

A. Furnish, set and mark all line location stakes. Assign a qualified layout engineer, surveyor, or technical specialist to do this work; this person shall be always on site when work requiring control is being performed. Furnish and maintain on site necessary equipment, supplies and instruments related thereto. Make this equipment and personnel available, at no additional cost to the Owner, for the purpose of verifying layout and certifying the accuracy of work on the site.

1.4 SUBMITTALS

A. Comply with Section 01 3300.

B. Submit Pavement Marking Paint product information.

PART 2 - PRODUCTS

2.1 PAINT

A. Paint shall be white and red traffic paint or compound suitable for paved surfaces conforming to the requirements of Federal Specification TT-P-85E Type I and Type II. Paint shall be lead free.

B. Paint shall be delivered and stored in sealed containers that plainly show the designated name, formulation, or specification number, batch number, color, date of manufacture, manufacturer's name, formulation number and directions, all of which shall be printed legibly at time of use. The paint shall be homogeneous, easily stirred to a smooth consistency, and shall show no hard settlement or other objectionable characteristics.

2.2 TRUNCATED DOMES FOR DETECTABLE WARNING

A. Truncated domes shall be per the contract documents, WSDOT Specifications, and City of Mukilteo Development Standards.

2.3 SITE SIGNS

A. Site signs shall be as indicated on plans.

PART 3 - EXECUTION

3.1 GENERAL

A. The Contractor shall furnish and experienced technician to supervise the location, alignment, layout, dimensions, and applications of pavement markings.

B. All surfaces to be marked shall be thoroughly cleaned before application of the paint. Dust, dirt and other granular surface deposits shall be removed by sweeping, blowing with compressed air, rinsing with water or a combination of the methods as required. Rubber deposits, surface laitance, and other coating adhering to the pavement shall be completely removed with scrapers, wire brushes, sandblasting, approved chemicals or mechanical abrasion as directed.

C. Paint Application: Two applications of paint will be required to complete all paint markings. Apply paint evenly to the pavement surface to be coated at the rate of 105, plus or minus 5, square feet per gallon. Apply paint to clean, dry surfaces, and unless otherwise approved, only when air and pavement temperatures are above 40 degrees F and less than 95 degrees. Maintain paint temperature within these same limits. Apply paint pneumatically with approved equipment.

D. Provide guide lines and templates as necessary to control paint application. Take special precautions in marking letters and symbols. Sharply outline edges of marking. The maximum drying time requirement of the paint specifications shall be strictly enforced, to prevent undue softening of bitumen, and pickup, displacement or discoloration by tires of traffic. Discontinue painting operations if there is a deficiency in drying of the marking, until cause of the slow drying is determined and corrected.

E. Parking Area:

1. Parking Stall or Lane Striping shall be 4 inches wide painted white as noted on the plans.

F. Fire Lane Striping:

1. Fire lane access roads shall be marked per City of North Bend Fire Lane Standards and Detail 3 on Sheet C310.

G. Paint shall be applied uniformly at a rate specified in Section 8-22 of the referenced specification. All markings shall be protected from traffic until the paint is thoroughly dry. All markings shall present a clean cut, uniform, and workmanlike appearance. All marking which fail to have a uniform, satisfactory appearance shall be corrected by the Contractor at his expense.

H. Signage:

1. Install signs per details and locations shown on the plans. Sign installation shall be in accordance with WSDOT Section 8-21.3(2) and MUTCD.

I. Cleaning: Leave premises clean and free of residue of work of this Section.

END OF SECTION 32 17 23

SECTION 33 40 00 – STORM DRAINAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Work includes but is not limited to the following:

1. Furnish and install downspout drainage lines, cleanouts, catch basins, footing drains, and storm drainage piping and fittings of the type and sizes designated.
2. Provide Rain Vault excavation and backfill.
3. Construct Rain Vault detention system and associated structures.
4. Protect Rain Vault detention system area during construction.

1.2 RELATED SECTIONS

A. Coordinate related work specified in other parts of the Project Manual, including but not limited to the following:

1. Section 01 57 13 – TESC
2. Section 31 10 00 – Site Preparation
3. Section 31 22 00 – Earthwork
4. Section 31 41 33 – Trench Safety

1.3 REFERENCES

A. King County Surface Water Design Manual, 2021.

B. WSDOT - Standard Specifications for Road, Bridge and Municipal Construction, latest edition; Washington State Department of Transportation. Standard Plans, current edition.

C. City of North Bend Public Works Standards, June 2018.

D. City of North Bend Clearing, Grading, Filling, and Drainage Code, Chapter 19.10.

E. Geotechnical Engineering Report prepared by Associated Earth Sciences, Inc for Two Rivers Montessori School Additions, dated April 11, 2023.

1.4 PERMITS

A. The Contractor is responsible for obtaining permits required for work within the right of way.

B. The Contractor is responsible for obtaining any permits and arranging any inspections required for connection of private storm drain to the City of North Bend public storm drain.

1.5 DIMENSIONS AND LAYOUTS

A. The Contractor will be responsible for furnishing, setting, and marking all line location stakes. A qualified layout engineer, surveyor, or technical specialist must be assigned to the Contractor's crew for this work and shall be always on site when work requiring control is being performed, together with all necessary equipment, supplies and instruments related thereto. This equipment and personnel must be available, at no additional cost to the Owner, for the purpose of verifying layout and certifying the accuracy of work on the site.

B. The Contractor is responsible for review of all City and other records relative to the existing underground utilities. The Contractor is responsible for avoiding damage to these facilities and restoring all active utilities at the Contractor's own expense.

C. The Contractor is to notify the Owner’s Representative immediately of underground utilities encountered which are not shown on the drawings or Owner's survey or record drawings.

1.6 SUBMITTALS

A. Comply with Section 01 33 00.

B. No installation of material shall be made prior to until written approval has been obtained from the Engineer. Approval of material and equipment shall in no way preclude compliance with the plans and specifications.

C. Submit material product information including pipe, fittings, structures, etc.

D. Submit shop drawings for trench drain installation.

E. Record Drawings:

1. One complete set of drawings shall be provided as record drawings which shall be separated, clean prints reserved for the purpose of showing a complete picture of the work as actually installed. The contractor shall coordinate the record drawing requirements with the Utility Inspector in accordance with City of North Bend standards.
2. Record drawings shall also serve as work progress plans and the Contractor shall maintain daily a daily record of work progress with neat, legible notations. These drawings shall be kept at the job site and shall be available for inspection at all times.
3. All buried piping and indicated future connections exterior to the building shall be located both by depth and by location with respect to the project benchmark. All notations on record drawings of buried pipes shall be made before backfilling of that section of pipe is started.
4. At completion of the work, the Contractor shall sign, date, and provide the record drawings to the Architect, representing that it is an accurate depiction of the work completed.

F. As-Built Survey:

1. At the completion of the project, the Contractor is required to provide a complete underground utility survey (both PDF and AutoCAD) of all utilities installed as part of this project. This survey shall be performed, stamped and signed by a licensed surveyor, and shall be presented to Owner, Engineer and City for review and acceptance. Any changes to the survey prior to acceptance are the responsibility of the Contractor.

PART 2 - PRODUCTS

2.1 STORM DRAINAGE PIPE

A. Pipe used for Storm Drains located within the site shall be one or more of the following:

1. Solid wall Polyvinyl Chloride (PVC) pipe meeting ASTM D3034 SDR 35 for diameters up to 15 inches and ASTM F 679 for sizes 18 to 27 inches in diameter, with restrained gasketed joints.
2. High Density Polyethylene (HDPE) ADS N-12, or approved equal, WT (Water Tight) IB pipe (per ASTM F2648) shall have a smooth interior and annular exterior corrugations. Fittings shall conform to ASTM F 2306. Bell and spigot connections shall utilize a spun-on or welded bell and valley or saddle gasket meeting the watertight joint performance requirements of ASTM F 2306.
3. Ductile Iron Pipe (DIP), Class 52.

B. Footing drain, wall drain, and underdrain pipe shall be Polyvinyl Chloride (PVC) Pipe, SDR 35 with factory provided slotted perforations.

1. 90-degree bend fittings shall not be used on footing drains. Pipe bends shall be made by combination of multiple fitting of less than 90 degrees each, such as two 45-degree fittings.

2.2 CATCH BASINS

A. Catch basins Type 1 shall be in accordance with City of North Bend DWG NO. SD-1. Covers shall be Rectangular Herringbone frame and grate per City of North Bend DWG NO. SD-5.

B. Solid covers for CB Type 1 shall be per City of North Bend DWG NO. SD-4.

C. Catch basins Type 2 shall be in accordance with City of North Bend DWG NO. SD-3. Size shall be as indicated on plan. CB Type 2 shall have manhole ring and solid covers or frame and grate as indicated on plans, unless otherwise noted.

D. Solid covers for CB Type 2 shall be per City of North Bend DWG NO. SD-20.

E. Provide AC or GPK manhole adaptor for connections to catch basins and structures.

F. All covers and grates shall be bolt locking.

2.3 CLEANOUTS

A. Cleanouts shall conform to the contract documents. Size to match connection pipe.

B. Cleanout covers for cleanouts within paved areas and for downspout connections shall be Olympic Foundry Part #M1007 D/T cast iron cover and ring marked “STORM” or “DRAIN”.

C. Footing Drain Cleanout shall be provided at every 100 feet maximum and at bends that total 90 degrees. Locate cleanouts up stream of bends.

D. All covers shall be hex bolt locking.

2.4 AREA DRAINS

A. Area Drains shall be in accordance with City of North Bend DWG NO. SD-22.

B. Drains shall have a minimum 2-foot sump.

C. All covers shall be hex bolt locking.

2.5 STORMWATER DETENTION SYSTEM

A. Rain Vault Double Units (2.0 Module):

1. Injection molded plastic tank plates meeting the physical and chemical characteristics of Rain Vault Manufacturer.
2. The dimensions, elevations, layout, and requirements of the tank should match the project plans and details.

B. Impervious Liner:

1. 30 mil PVC geomembrane liner between two layers of non-woven Tencate Mirafi 180N (or equal) per recommendation from the Rain Vault detention system manufacturer.

2.6 BEDDING AND BACKFILL MATERIAL

A. Bedding and Backfill materials shall be in accordance with Section 31 22 00.

2.7 FOAM BLOCKING

A. Plastic Foam for pipe protection and separation between pipes shall meet the Federal Spec. PPP-C-1752B Type 1, Class 2 or approved equivalent.

2.8 CONDUCTIVE WARNING TAPE

A. Conductive warning tape shall be per Section 31 22 00.

PART 3 - EXECUTION

3.1 COORDINATION WITH OTHER WORK

A. Verify location from the records.

B. Before installation Contractor shall make proper provisions for site storm lines to avoid interferences with installation of other work and/or other Contractors. Any changes caused by Contractor's neglect to coordinate work shall be made by Contractor at Contractor's expense.

C. Site storm drain Drawings and Specifications shall be compared with Drawings and Specifications of other trades and any discrepancies between the documents shall be reported to the Owner’s Representative prior to installation of work.

D. Abandoning Existing Storm Drainage System - Where shown on the Plans or where directed by the Owner’s Representative, existing storm sewer pipes and structures shall be abandoned by:

1. Plugging pipe ends. In addition to plugging pipe ends, fill pipes larger than 8 inches with controlled density fill or approved equal.
2. Removing the existing structure to four (4) feet below the finished subgrade and filling existing pipes and the remaining structure with controlled density fill or approved equal.
3. Removing existing pipes or structures. - If the storm system is removed, unless otherwise directed by the Owner’s Representative, all trenches will be backfilled with the appropriate material. When native material has been determined as suitable backfill, backfill of the trench will be considered incidental to and included in the contract price for pipe. Excavated trench material that is not suitable as backfill shall be hauled to disposal in accordance with the special provisions at no additional cost to the Owner. Suitability of excavated material for trench backfill shall be at the sole discretion of the Owner’s Representative.
4. When filling existing storm sewer pipe or structures that are to be abandoned, care shall be used in placing the controlled density fill to ensure the pipe or structure is completely filled and no voids remain.

3.2 PIPE LAYING

A. Pipe laying shall be in conformance with WSDOT Section 7-08.3(2).

3.3 RAIN VAULT DETENTION SYSTEM

A. Assembly of the Rain Vault Units:

1. On-site assembly of tanks shall be performed in accordance with the Rain Vault Installation Manual, Section 2.

B. Layout and Excavation:

1. Installer shall stake out, excavate, and prepare the subgrade area to the required plan grades and dimensions, ensuring that the excavation is at least 2 feet greater than the Rain Vault dimensions in each direction allowing for installation of geotextile filter fabric, Rain Vault Triple modules, and free draining backfill materials.
2. All excavations must be prepared with OSHA approved excavated sides and sufficient working space.
3. Protect partially completed installation against damage from other construction traffic by establishing a perimeter with high visibility construction tape, fencing, barricades, or other means until construction is complete.
4. At base of excavation compact subgrade to a minimum of 95% of Standard Proctor (ASTM D698) density or as required by geotechnical engineer.

C. Preparation of Base:

1. Place a thin layer (3” unless otherwise specified) of bedding material (Section 2.03 A), over the subgrade to establish a level working platform for the Rain Vault modules. Level to within ½” (+/- ¼”) or as shown on the plans. Static roll or otherwise compact bedding materials until they are firm and unyielding.
2. Outline the footprint of the Rain Vault system on the excavation floor using spray paint or chalk line to ensure a 2’ perimeter is available around the Rain Vault system for proper installation and compaction of backfill.

D. Installation of the Rain Vault Units:

E. Install per manufacture recommendations and specifications.

F. Backfilling of the Rain Vault Units:

1. Place freely draining backfill materials (Section 312200: Gravel Backfill for Drains) around the perimeter in lifts with a maximum thickness of 12”. Each lift shall be placed around the entire perimeter such that each lift is no more than 24” higher than the side backfill along any other location on the perimeter of the Rain Vault system. No fill shall be placed over top of tanks until the side backfill has been completed.

2. Each lift shall be compacted at the specified moisture content to a minimum of 95% of the Standard Proctor Density until no further densification is observed (for self-compacting stone materials). The side lifts must be compacted with walk behind compaction equipment.
3. Take care to ensure that the compaction process does not allow the machinery to come into contact with the modules due to the potential for damage to the geotextile and Rain Vault units.
4. No compaction equipment is permissible to operate directly on the Rain Vault modules.
5. Following placement of side backfill, a uniform 12" lift of the freely draining material shall be placed over the Rain Vault and lightly compacted using a walk-behind trench roller.

G. Where pipe crossings are separated by less than 6 inches, place foam blocking for separation and protection per manufacturer's recommendations.

3.4 CATCH BASIN AND STRUCTURE INSTALLATION OR MODIFICATION

A. Structures shall be installed or modified in accordance with WSDOT Section 7-05.3 and City of North Bend Standards.

B. Adjustments to existing structures to remain shall be in accordance with WSDOT Section 7-05.3(1) and City of North Bend Standards.

3.5 CLEANING AND TESTING

A. Cleaning and testing shall be in conformance with WSDOT Section 7-04.3(1) with the following exceptions:

1. The Contractor shall be responsible for providing DVDs of video inspection.
2. The Contractor shall be responsible for notifying the Owner's Representative 48 hours in advance of the backfill of any storm drain line.
3. The minimum amount of testing required by these specifications shall be as follows:

Item	**Frequency of Tests**
Air Testing Storm Drains	One (1) test from structure to structure

4. The frequency of tests shown above shall govern the actual quantity of tests. Any retesting that is required due to failure of initial testing to show compliance with these contract documents, shall be provided and paid for at the Contractor's sole expense.

3.6 PERMANENT CONNECTIONS TO EXISTING SYSTEMS

A. Where indicated on the plans, make permanent connections to existing storm drainage systems.

B. Where existing pipe is to be connected to a new structure, replace existing pipe and/or add fittings and pipe as necessary to provide an approved connection per WSDOT and City of North Bend Standards.

END OF SECTION 33 40 00