

**PROJECT MANUAL OF
CONSTRUCTION DOCUMENTS**

**BEAVERTON SD
FACILITY OFFICE RENOVATION**

Project No: 23030

Beaverton School District
16550 SW Merlo Road
Beaverton, OR 97003

PERMIT / BID SET

VOLUME 1 OF 2
(Divisions 00 - 12)

April 19, 2023

PROJECT MANUAL OF
CONSTRUCTION DOCUMENTS

BEAVERTON SD FACILITY OFFICE RENOVATION

OWNER
BEAVERTON SCHOOL DISTRICT
16550 SW Merlo Road
Beaverton, OR 97003
503.591-4449

Aaron Boyle, Administrator for Facilities Development
Aaron_Boyle@beaverton.k12.or.us



ARCHITECT
BLRB Architects, P.S.
621 SW Morrison Street, Suite 950
Portland, OR 97205
503.595.0270

Jonah Jensen, AIA, Principal-in-Charge - jjensen@blrb.com
Larry Black, AIA, Project Manager - lblack@blrb.com
Angela Borrowman, Interior Designer, aborrowman@blrb.com

ARCHITECT'S CONSULTANTS

MECHANIAL / ELECTRICAL ENGINEER
SĂZĂN GROUP INC
111 Southwest Fifth Ave., Suite 3210
Portland, OR 97204
503.416.2400
Contact: Daniel Touger, P.E., Managing Principal
Email: dtouger@sazan.com

Beaverton SD Facility Office Renovation
Set
Beaverton School District
BLRB Project No.: 23030

Permit/Bid

April 17, 2023

ARCHITECT'S SEAL

The undersigned hereby certifies that the Architectural Technical Specifications in this project manual were prepared by me or under my direct supervision, and that I am duly registered under the laws of the State of Oregon and hereby affix my Professional Seal.

BLRB Architects

END OF ARCHITECTURAL CERTIFICATION

BLRB Architects
Portland, OR

SEALS
00 01 07 - 1

Beaverton SD Facility Office Renovation
Set
Beaverton School District
BLRB Project No.: 23030

Permit/Bid
April 17, 2023

ELECTRICAL ENGINEER'S SEAL

The undersigned hereby certifies that the Electrical Technical Specifications in this project manual were prepared by me or under my direct supervision, and that I am duly registered under the laws of the State of Oregon and hereby affix my Professional Seal.

SAZAN GROUP, INC.

END OF ELECTRICAL CERTIFICATION

TABLE OF CONTENTS

VOLUME 1

INTRODUCTORY INFORMATION

00 00 00	COVER SHEET
00 01 05	FRONTISPIECE
00 01 07	SEALS
00 01 10	TABLE OF CONTENTS

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

00 43 22	UNIT PRICES FORM
00 43 23	ALTERNATES FORM
00 43 25	SUBSTITUTION REQUEST FORM
00 83 00	PREVAILING WAGE RATES

DIVISION 01 - GENERAL REQUIREMENTS

01 10 00	SUMMARY
01 21 00	ALLOWANCES
01 22 00	UNIT PRICES
01 23 00	ALTERNATES
01 25 00	SUBSTITUTION PROCEDURES
01 26 00	CONTRACT MODIFICATION PROCEDURES
01 26 00.1	ASI Form
01 29 00	PAYMENT PROCEDURES
01 31 00	PROJECT MANAGEMENT AND COORDINATION
01 31 00.1	RFI Form
01 32 00	CONSTRUCTION PROGRESS DOCUMENTATION
01 33 00	SUBMITTAL PROCEDURES
01 40 00	QUALITY REQUIREMENTS
01 42 00	REFERENCES
01 60 00	PRODUCT REQUIREMENTS
01 73 00	EXECUTION
01 74 19	CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
01 77 00	CLOSEOUT PROCEDURES
01 77 00.1	Warranty Closeout Form
01 77 00.2	Punchlist Closeout Form
01 78 23	OPERATION AND MAINTENANCE DATA
01 78 39	PROJECT RECORD DOCUMENTS
01 79 00	DEMONSTRATION AND TRAINING

DIVISION 02 - EXISTING CONDITIONS

02 41 19	SELECTIVE DEMOLITION
----------	----------------------

DIVISION 03 - CONCRETE

03 30 00	CAST-IN-PLACE CONCRETE
03 36 00	GROUND AND POLISHED CONCRETE

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

06 20 23 INTERIOR FINISH CARPENTRY

DIVISION 08 - OPENINGS

08 11 13 HOLLOW METAL DOORS AND FRAMES

08 14 16 FLUSH WOOD DOORS

DIVISION 09 - FINISHES

09 29 00 GYPSUM BOARD

09 30 00 TILING

09 51 13 ACOUSTICAL PANEL CEILINGS

09 61 05 VAPOR CONTROL FOR FLOORING

09 65 13 RESILIENT BASE AND ACCESSORIES

09 68 00 CARPETING

09 91 23 INTERIOR PAINTING

09 93 00 STAINING AND TRANSPARENT FINISHING

DIVISION 10 - SPECIALTIES

10 14 00 INTERIOR SIGNAGE

10 26 00 WALL AND DOOR PROTECTION

10 44 13 FIRE EXTINGUISHER CABINETS

10 44 16 FIRE EXTINGUISHERS

DIVISION 12 - FURNISHINGS

12 24 13 ROLLER WINDOW SHADES

12 32 00 MANUFACTURED WOOD CASEWORK

12 48 13 ENTRANCE MATS

VOLUME 2

DIVISION 22 - PLUMBING

22 05 16 EXPANSION FITTINGS AND LOOPS FOR PLUMBING PIPING

22 05 23 GENERAL-DUTY VALVES FOR PLUMBING PIPING

22 05 53 IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

22 07 19 PLUMBING PIPING INSULATION

22 08 00 COMMISSIONING OF PLUMBING

22 10 05 PLUMBING PIPING

22 10 06 PLUMBING PIPING SPECIALTIES

22 30 00 PLUMBING EQUIPMENT

22 40 00 PLUMBING FIXTURES

DIVISION 23 – HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

23 05 53 IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC

23 07 13 DUCT INSULATION

23 09 13 INSTRUMENTATION AND CONTROL DEVICES FOR HVAC

23 31 00 HVAC DUCTS AND CASINGS

23 33 00 AIR DUCT ACCESSORIES
23 37 00 AIR OUTLETS AND INLETS

DIVISION 26 - ELECTRICAL

26 05 05 SELECTIVE DEMOLITION FOR ELECTRICAL
26 05 11 REQUIREMENTS FOR ELECTRICAL INSTALLATIONS
26 05 19 LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLE
26 05 26 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
26 05 29 HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS
26 05 33.13 CONDUIT FOR ELECTRICAL SYSTEMS
26 05 33.16 BOXES FOR ELECTRICAL SYSTEMS
26 05 48 VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS
26 05 53 IDENTIFICATION FOR ELECTRICAL SYSTEMS
26 08 00 COMMISSIONING OF ELECTRICAL
26 09 23 LIGHTING CONTROL DEVICES
26 24 16 PANELBOARDS
26 27 26 WIRING DEVICES
26 28 13 FUSES
26 28 16.16 ENCLOSED SWITCHES
26 51 00 INTERIOR LIGHTING

DIVISION 27 - COMMUNICATIONS

27 05 29 HANGERS AND SUPPORTS FOR COMMUNICATIONS SYSTEMS
27 05 33.13 CONDUIT FOR COMMUNICATIONS SYSTEMS
27 10 00 STRUCTURED CABLING

DIVISION 26 – ELECTRICAL SAFETY AND SECURITY

28 46 00 FIRE DETECTION AND ALARM

END OF TABLE OF CONTENTS

This page intentionally left blank

SECTION 00 43 22 - UNIT PRICES FORM

PART 1 - GENERAL

1.01 BID INFORMATION

- A. Bidder: _____.
- B. Project Name:
 - 1. Beaverton SD Facility Office Renovation.
- C. Project Location:
 - 1. 16550 SW Merlo Road, Beaverton, OR 97003.
- D. Owner: Beaverton School District, SW Merlo Rd, Beaverton, OR 97003.
- E. Architect: BLRB Architects. 621 SW Morrison St, Suite 950, Portland, OR 97205.

1.02 BID FORM SUPPLEMENT

- A. This form is required to be attached to the Bid Form.
- B. The undersigned Bidder proposes the amounts below be added to or deducted from the Contract Sum on performance and measurement of the individual items of Work and for adjustment of the quantity given in the Unit-Price Allowance for the actual measurement of individual items of the Work.
- C. If the unit price does not affect the Work of this Contract, the Bidder shall indicate "NOT APPLICABLE."

1.03 UNIT PRICES

- A. Unit Price 1: (MATERIAL)
 - 1. _____ Dollars (\$) per unit.

1.04 SUBMISSION OF BID SUPPLEMENT

- A. Respectfully submitted this ____ day of _____, 20__.
- B. Submitted By: _____ (Insert name of bidding firm or corporation)
- C. Authorized Signature: _____ (Handwritten signature)
- D. Signed By: _____ (Type or print name)
- E. Title: _____ (Owner/Partner/President/Vice President)

PART 2 - PRODUCTS (NOT USED)

Beaverton SD Facility Office Renovation
Beaverton School District
BLRB Project No.: 23030

Permit/Bid Set
April 17, 2023

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 00 43 23 - ALTERNATES FORM

PART 1 - GENERAL

1.01 BID INFORMATION

- A. Bidder: _____.
- B. Project Name: Beaverton SD Facility Office Renovation.
- C. Project Location: 16550 SW Merlo Road, Beaverton, OR 97003.
- D. Owner: Beaverton School District.
- E. Architect: BLRB Architects.

1.02 BID FORM SUPPLEMENT

- A. This form is required to be attached to the Bid Form.

1.03 DESCRIPTION

- A. The undersigned Bidder proposes the amount below be added to or deducted from the Base Bid if particular alternates are accepted by Owner. Amounts listed for each alternate include costs of related coordination, modification, or adjustment.
 - 1. Cost-Plus-Fee Contract: Alternate price given below includes adjustment to Contractor's Fee.
- B. If the alternate does not affect the Contract Sum, the Bidder shall indicate "NO CHANGE."
- C. If the alternate does not affect the Work of this Contract, the Bidder shall indicate "NOT APPLICABLE."
- D. The Bidder shall be responsible for determining from the Contract Documents the affects of each alternate on the Contract Time and the Contract Sum.
- E. Owner reserves the right to accept or reject any alternate, in any order, and to award or amend the Contract accordingly within 60 days of the Notice of Award unless otherwise indicated in the Contract Documents.
- F. Acceptance or non-acceptance of any alternates by the Owner shall have no affect on the Contract Time unless the "Schedule of Alternates" Article below provides a formatted space for the adjustment of the Contract Time.

1.04 SCHEDULE OF ALTERNATES

- A. Alternate No. 1: _____
 - 1. ADD _____ DEDUCT _____ NO CHANGE _____ NOT APPLICABLE _____.
 - 2. Dollars (\$ _____).

1.05 SUBMISSION OF BID SUPPLEMENT

- A. Respectfully submitted this ____ day of _____, 20__.
- B. Submitted By: _____ (Insert name of bidding firm or corporation).
- C. Authorized Signature: _____ (Handwritten signature).
- D. Signed By: _____ (Type or print name).
- E. Title: _____ (Owner/Partner/President/Vice President).

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 00 43 23

SECTION 00 43 25 – SUBSTITUTION REQUEST FORM (PRE-BID)

PROJECT: BEAVERTON SD FACILITY OFFICE RENOVATION

SPECIFIED ITEM: _____

Section _____ **Paragraph** _____ **Description** _____

PROPOSED SUBSTITUTION:

Attached data includes product description, specifications, drawings, photographs, performance and test data, manufacturer's warranty documentation adequate for evaluation of request, including identification of applicable data portions. **FAXES WILL NOT BE ACCEPTED.**

Attached data also includes description of changes to Contract Documents which the proposed substitution requires for proper installation.

UNDERSIGNED CERTIFIES FOLLOWING ITEMS, UNLESS MODIFIED BY ATTACHMENTS, ARE CORRECT:

1. Proposed substitution does not affect dimensions shown on drawings.
2. Undersigned pays for changes to building design, including engineering design, detailing, and construction costs caused by proposed substitution.
3. Proposed substitution has no adverse effect on other trades, construction schedule, or specified warranty requirements.
4. Maintenance and service parts available locally or readily obtainable for proposed substitution.
5. No effect on applicable code requirements.

UNDERSIGNED FURTHER CERTIFIES FUNCTION, APPEARANCE, AND QUALITY OF PROPOSED SUBSTITUTION ARE EQUIVALENT OR SUPERIOR TO SPECIFIED ITEM.

UNDERSIGNED AGREES, IF THIS PAGE IS REPRODUCED, TERMS AND CONDITIONS FOR SUBSTITUTIONS FOUND IN BIDDING DOCUMENTS APPLY TO THIS PROPOSED SUBSTITUTION.

Signature below must be by person having authority to legally bind its firm to above terms.

Submitted by:		For use by A/E	
Name (Printed or typed)		<input type="checkbox"/> Approved	<input type="checkbox"/> Approved as noted
Signature _____ Date _____		<input type="checkbox"/> Not Approved	<input type="checkbox"/> Received too late
Firm Name		By _____ Date _____	
Address		Remarks:	
City, State, Zip			
Tel _____ Email _____			

END OF SECTION 00 43 25

This page intentionally left blank

SECTION 00 83 00 - PREVAILING WAGE RATES

PART 1 - GENERAL

1.01 OREGON PUBLIC WORKS PREVAILING WAGE REQUIREMENTS

- A. This is a prevailing wage project, subject to the provisions of ORS 279C.830, except that, off-site manufacturers of standard items for sale on the general market are not subject to the prevailing wage requirements of the Statute. Even though prevailing wage rates may be listed in the Contract Documents, the Contractor is responsible to verify the accuracy of any such listing.
- B. State of Oregon Prevailing Wage Requirements - See Article 3.4.5 of the General Conditions.

A list of the Prevailing Wage Rates as required per ORS 279C.830 and as furnished by the State of Oregon Bureau of Labor and Industries are available electronically on the bureau's website at www.oregon.gov/boli. One complimentary hard copy of each PWR publication is available upon request by emailing BOLI at pwremail@boli.state.or.us or calling 971-673-0838.

- C. Oregon Prevailing Wage Laws: Contractor shall pay each worker employed in the performance of this contract not less than the higher of the wage rate for the type of work being performed as set forth in either the Oregon Prevailing Wage set forth in the "Prevailing Wage Rates for Public Works Contracts in Oregon" or the applicable federal Davis-Bacon Wage Decision.

Standard documentation required by the Department of Labor and Industries is required to be provided:

A list of the applicable prevailing wage rates is available at URL:

1. <http://www.oregon.gov/boli>.
2. Date to use to determine wage rates: The date in effect as of the date that bids are due.
3. County in which the public works project is located: Washington County.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 00 83 00

This page intentionally left blank

SECTION 01 10 00 - SUMMARY

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Project information.
 - 2. Work covered by Contract Documents.
 - 3. Access to site.
 - 4. Work restrictions.
 - 5. Specification and Drawing conventions.
 - 6. Owner occupancy.
- B. Related Sections:
 - 1. Division 01 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.02 PROJECT INFORMATION

- A. Project Identification: Beaverton School District Facility Office Renovation.
 - 1. Project Location: 16550 SW Merlo Road, Beaverton, OR 97003.
- B. Owner: Beaverton School District. 16550 SW Merlo Road, Beaverton, 97003.
 - 1. Owner's Representative: Aaron Boyle, Administrator for Facility Dept., (503)356-4435.
- C. Architect: BLRB Architects, 621 SW Morrison St. #950, Portland, OR 97702.
 - 1. Architect's Representative: Jonah Jensen, AIA, Managing Principal, (503) 595-0270.

1.03 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents. In summary, and without force and effect on the Contract Documents the Work consists of the following:
 - 1. Description of Work: This project consists of the removal of internal partitions, demo and replacement of existing toilets with ADA compliant gender-neutral toilets, shifting of the server room, revisions to HVAC to serve new open layout, and replacement of light fixtures with LED fixtures, in building A of the Beaverton School Auxiliary District Facility.
 - 2. Alternative #1 description of work: Demolish existing, interior offices to create open area for professional development meetings, modify existing HVAC, as needed, modify electrical, as needed, and new partition.
 - 3. Base and Alternate Bids: The Contract Documents indicate the scope of work for Base bid and Alternate Bid work.
 - 4. All quantities and areas indicated on the Code Compliance Drawings portion of the contract documents are for agency review purposes only, unless specifically indicated otherwise. Elements of the Work may be shown on the Code Compliance Drawings.
 - 5. Contractor shall be responsible for determining all areas and quantities.
- B. Type of Contract.

1. Project will be constructed under a single prime contract with a fixed Contract Sum.

1.04 OWNER-FURNISHED PRODUCTS

- A. Owner will furnish products indicated in individual specification sections. The Work includes providing support systems to receive Owner's equipment and making plumbing, mechanical, and electrical connections.
- B. Owner-Furnished Products:
 1. See individual Specification Sections for Owner Furnished Contractor Installed (OFCl) items.

1.05 ACCESS TO SITE

- A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by areas within the Contract limits indicated, compliance with codes and regulations, and the Owner's right to perform work or to retain other contractors on portions of Project.
- B. Use of Site: Do not disturb portions of Project site beyond areas in which the Work is indicated.
 1. Limits: Confine construction operations to within areas where work is permitted.

1.06 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. Parking Restrictions: On site parking. Limited off-site parking is allowed where it does not disrupt traffic or neighbors in any way. All construction staff, equipment and material deliveries, site visitors, etc. are shall be limited to park on-site only. Contractor has responsibility to enforce this requirement.
- C. 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 three days in advance of proposed disruptive operations.
 2. Do not proceed with disruptive interruptions without Owner's written permission.
- D. Nonsmoking Building: Smoking is not permitted on property, within the building or within 25 feet of entrances, operable windows, or outdoor-air intakes.
- E. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

1.07 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 50-division format and CSI/CSC's "MasterFormat" numbering system.
 1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of

- the Project Manual to determine numbers and names of Sections in the Contract Documents.
2. Division 01: Sections in Division 01 govern the execution of Work of all Sections in the Specifications.
- B. 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. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not state, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
 - a. 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.
 3. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 OWNER OCCUPANCY:

- A. Owner reserves the right to occupy the project prior to the Owner's acceptance of the work.
- B. Use and occupancy by Owner prior to project acceptance does not relieve Contractor of his responsibility to maintain all insurance and bonds required of Contractor under the contract until project is completed and accepted by Owner.

END OF SECTION 01 10 00

This page intentionally left blank

SECTION 01 21 00 - ALLOWANCES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Allowances, included within Base Bid, covering costs of providing items not determined as to number or amount by Contract Documents.
- B. Related Sections:
 - 1. Section 01 22 00 - Unit Prices: For use with Quantity Allowances.
 - 2. Section 01 33 00 - Submittal Procedures.
 - 3. Section 01 26 00 - Contract Modification Procedures.

1.02 CASH ALLOWANCES

- A. Costs Included in Allowance:
 - 1. Actual material cost of Products, less sales taxes.
 - 2. Delivery, unloading, uncrating, storage, handling, and coordination.
 - 3. Complete installation costs including providing related work for complete and finished installation.
- B. Architect Responsibilities:
 - 1. Consult with Contractor. Determine specific requirements, including size, type, and quantity, conforming with provisions of Sections affected by Allowances.
 - 2. Select Products in consultation with Owner and transmit decision to Contractor.
 - 3. Prepare Change Order for cost difference above or below stipulated Allowance based on Unit Prices specified Section 012200.
- C. Contractor Responsibilities:
 - 1. Include stipulated Allowances as part of Base Bid.
 - 2. Assist in finalizing Product determination, such as size, type, and quantity, as necessary to conform to provisions Sections affected by Allowances.
 - 3. Submit cost proposals in conformance to Contract Modification provisions of Section 012600 and the Conditions of the Contract.
 - 4. Submit Shop Drawings, Product Data, and Samples in accordance with Section 013300.
 - 5. Provide Products affected by allowances under Work of this Contract.
- D. Cost Adjustments: Adjust cost above or below stipulated allowance by Change Order. Any remaining allowance to be credited to Owner.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

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

3.03 SCHEDULE OF ALLOWANCES

- A. See Division 00 for description of project Allowances.

END OF SECTION 01 21 00

SECTION 01 22 00 - UNIT PRICES

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes administrative and procedural requirements for unit prices.
- B. Related Sections include the following:
 - 1. Division 01 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
 - 2. Division 01 Section "Quality Requirements" for general testing and inspecting requirements.

1.02 DEFINITIONS

- A. Unit price is an amount proposed by bidders, stated on the Bid Form, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased or decreased.

1.03 PROCEDURES

- A. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- B. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- C. List of Unit Prices: A list 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

3.01 LIST OF UNIT PRICES

- A. Unit Price No. 1 - _____.
 - 1. Description:
 - 2. Unit of Measurement:

END OF SECTION 01 22 00

This page intentionally left blank

SECTION 01 23 00 - ALTERNATES

PART 1 - GENERAL

1.01 SUMMARY

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

1.02 DEFINITIONS

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

1.03 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 SCHEDULE OF ALTERNATES

- A. Add Alternate 1 - _____:
1. Base Bid:
 2. Add Alternate:

END OF SECTION 01 23 00

SECTION 01 25 00 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.02 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.

1.03 ACTION SUBMITTALS

- A. Substitution Requests: Submit one electronic copy of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use BLRB 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 cannot be provided, if applicable.
 - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. 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 and names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.

- i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
 - n. Contractor shall sign Substitution Request Form.
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 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.

1.04 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.

1.05 PROCEDURES

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

PART 2 - PRODUCTS

2.01 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 30 days after the Notice to Proceed. 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 3 - EXECUTION (NOT USED)

END OF SECTION 01 25 00

This page intentionally left blank

SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Sections include the following:
 - 1. Division 01 Section "Unit Prices" for administrative requirements for using unit prices.
 - 2. Division 01 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.02 MINOR CHANGES IN THE WORK

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

1.03 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 for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
 - 2. Within 10 days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - e. Quotation Form: Use forms provided by Owner. Sample copies are included in Project Manual.
- B. Contractor-Initiated Work Change Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
 - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.

2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 4. Include costs of labor and supervision directly attributable to the change.
 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 6. Comply with requirements in Division 01 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
- C. Proposal Request Form: Use BLRB, PR Form for Proposal Requests provided by Owner. Sample copies are included at end of this Section.

1.04 CHANGE ORDER PROCEDURES

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

1.05 CONSTRUCTION PROPOSAL REQUEST (PR)

- A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor similar to AIA Document G701 form. Refer to Standard Form American Institute of Architects, AIA Document G701-2017.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 26 00

PROJECT:	ASI No.
PROJECT No.	DESCRIPTION:
OWNER:	ISSUE DATE:
CONTRACTOR:	CONTRACT DATE:

To General Contractor:
The Work shall be carried out in accordance with the following supplemental instructions issued in accordance with the Contract Documents without change in Contract Sum or Contract Time. Proceeding with the Work in accordance with these instructions indicates your acknowledgment that there will be no change in the Contract Sum or Contract Time.

Attachments:

Architect Signature: _____

cc: ☐ Owner ☐ Civil ☐ Structural ☐ Mech ☐ Elec ☐ Land ☐ Other

Job No. _____ PR/CCD No. _____
Project: _____
Owner: _____
Date: _____

PROPOSAL REQUEST CONSTRUCTION CHANGE DIRECTIVE

THIS IS NOT A CHANGE ORDER

PART A: PROPOSAL REQUEST

To General Contractor:

Please submit an itemized quotation for change in the contract sum and/or time incidental to proposed modifications to the contract documents described herein. Provide itemized quotation which separates material costs, labor costs, equipment costs and overhead and profit. Furnish all labor, material and equipment necessary to perform the following:

Architect: BLRB Architects, P.S. Date: _____
cc: ☐ Owner ☐ Civil ☐ Structural ☐ Mechanical ☐ Electrical ☐ Other: _____

To Architect:
Proposal (Breakdown Attached):

Cost : _____ Change in Contract Time Proposed _____ Days
(A time extension must be detailed and justified for review.)

Contractor _____ Date: _____

To: ☐ Civil ☐ Structural ☐ Mechanical ☐ Electrical
☐ We have examined the foregoing proposal, have found the cost reasonable and recommend its acceptance.
☐ We have examined the foregoing proposal and recommend disapproval because:

Consultant (Name of Firm): _____
Engineer: _____ Date: _____

To Owner: We have examined the foregoing proposal, have found the cost reasonable and recommend its acceptance.

Architect: BLRB Architects Date: _____

Disapproved by (Architect or Owner): _____
Reason for Disapproval:

Status: Revised Proposal Requested _____ Cancel Proposal _____ Other _____

PART B: CONSTRUCTION CHANGE DIRECTIVE

1. The proposed basis of adjustment to the Contract Sum or Guaranteed Maximum Price is:

- ☐ Lump Sum of \$ _____
☐ Unit Price of \$ _____ per _____
☐ As Follows

2. The contract time is proposed to (be adjusted) (remain unchanged). The proposed adjustment, if any is (an increase of _____ days) (a decrease of _____ days).

When signed by the Owner and Architect and received by the Contractor, This document becomes effective immediately as a Construction Change Directive (CCD) and the Contractor shall proceed with the change(s) described above.

BLRB Architects

Architect

Date

Owner

Date

Signature indicates the Contractor's agreement with the proposed adjustments in Contract Sum and Contract Time set forth in this Construction Change Directive

Contractor

Date

SECTION 01 29 00 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 - 1. Division 01 Section "Unit Prices" for administrative requirements governing the use of unit prices.
 - 2. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 3. Division 01 Section "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.02 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.

1.03 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittals schedule.
 - c. Contractor's Construction schedule.
 - 2. Submit the Schedule of Values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
 - 3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values coordinated with each phase of payment.
- 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 the Schedule of Values in tabular form with separate columns to indicate the following for each item listed.

- a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of the subcontractor.
 - d. Name of the manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value.
 - 1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate or as requested by Architect. Include separate line items under required principal subcontracts for construction scheduling, operation and maintenance manuals, punch list activities, Project Record Documents, and demonstration and training in the amount of 5 percent of the Contract Sum.
4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If specified, include evidence of insurance or bonded warehousing.
6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. 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.
8. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
9. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.04 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: Progress payments date is indicated in Agreement.
- C. Payment Application Forms: Use AIA Document G702, and AIA Document G703 Continuation Sheets as form for Applications for Payment, or as authorized by Architect.
- 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 of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit four (4) signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours unless Owner authorized use of electronic submittals. 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.
- F. 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 final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- G. 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.
 5. Schedule of unit prices.
 6. Submittals Schedule (preliminary if not final).
 7. List of Contractor's staff assignments.
 8. List of Contractor's principal consultants.
 9. Copies of building permits.
 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 11. Initial progress report.
 12. Report of preconstruction conference.
 13. Certificates of insurance and insurance policies.
 14. Performance and payment bonds.
 15. Data needed to acquire Owner's insurance.
 16. Initial settlement survey and damage report if required.
- H. 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 Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. 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 G706-1994, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A-1994, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707-1994, "Consent of Surety to Final Payment."
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

1.01 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. Web-base Project software.
 - 5. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific contractor.
- C. Related Sections:
 - 1. Division 01 Section "Construction Progress Documentation" for preparing and submitting Contractor's Construction Schedule.
 - 2. Division 01 Section "Execution" for procedures for coordinating general installation.
 - 3. Division 01 Section "Closeout Procedures" for coordinating closeout of the Contract.

1.02 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.
- C. EDMS: Electronic Document Management System is web-based Project software that enables the Owner, Contractor, and Architect to transfer documents and information online electronically. System includes the following Project Documents:
 - 1. Calendar: Scheduling for meetings.
 - 2. Meeting Notes.
 - 3. COP Log: Log of Contractor initiated change order proposal requested.
 - 4. RFI Log and Document Form: Site location for the Contractor to write and request information for a answer to questions, clarifications and request additional information. Site allows view of outstanding and past RFI's issued by the Contractor. Contractor to log and maintain RFI information and RFI logs for Project Team review in real time.
 - 5. ASI: Provides a log, form for printing and ability to attach information to the General Contractor.
 - 6. Submittal Log: Site allows viewer to see a current log of submittals transmitted to the A/E team and outgoing submittals transmitted back to the Contractor.

1.03 INFORMATIONAL SUBMITTALS

- A. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in

attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers.

Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.04 GENERAL COORDINATION PROCEDURES

- A. Use of the web-based Project software: Contractor is required to keep their information current and up to date on web-based Project software. Contractor can maintain additional company logs if needed, however the web-based Project software system is to be kept current as a Contract requirement for coordination of the Work. The system also keeps a permanent version history of all data inputted and deleted.
- B. 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.
- 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 and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 1. Preparation and distribution 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.
- E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.05 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 scale. Do not base Coordination Drawings on reproductions of the Contract Documents or 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 required installation sequences.
 - e. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
2. Refer to individual sections for Coordination Drawing requirements for Work in those Sections.
3. Coordination of Drawing Prints: Prepare coordination drawings according to requirements in Division 01 Section "Submittal Procedures."

1.06 REQUESTS FOR INFORMATION (RFI)

- A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified through the web-based Project software.
 1. RFIs shall originate with Contractor using the Architect's form available electronically online through the web-based Project software. RFIs submitted by entities other than Contractor will be returned with no response. Form required to be filled out is included at the end of this section.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
 3. All RFI's are to be handled electronically via PDF format.
- B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
 1. Project name.
 2. Date.
 3. Name of Contractor.
 4. Name of Architect.
 5. RFI number.
 6. Specification Section number and title and related paragraphs, as appropriate.
 7. Drawing number and detail references, as appropriate.
 8. Field dimensions and conditions, as appropriate.
 9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 10. Contractor's signature.
 11. Attachments: Include PDF scanned drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation. Submit documents electronically and

attach to the RFI by linking files through the web-based Project software.

- C. Software-Generated RFIs: Software-generated form with substantially the same content as indicated above.
 - 1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- D. Architect's Action: Architect will review each RFI, determine action required, and return it. Allow 14 days for Architect's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.
 - 1. The following RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for coordination information already indicated in the Contract Documents.
 - d. Requests for adjustments in the Contract Time or the Contract Sum.
 - e. Requests for interpretation of Architect's actions on submittals.
 - f. Incomplete RFIs or RFIs with numerous errors.
 - 2. Architect's action may include a request for additional information, in which case Architect's time for response will start again.
 - 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "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 7 days of receipt of the RFI response.
- E. On receipt of Architect's action, immediately update the RFI log on the web-based Project software. Site then immediately becomes updated and available to affected parties. Review response and notify Architect within 2 days if Contractor disagrees with response.
 - 1. General Contractor is responsible for transmitting RFI information to other individuals not having permission to web-based Project software.

1.07 DIGITAL PROJECT MANAGEMENT PROCEDURES

- A. Use of Architect's Digital Data Files: Digital data files of Architect's BIM and 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 2018 and AutoCAD 2013, or current edition.
 - 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 form acceptable to Owner and Architect.
 - 5. [Insert additional conditions on which digital data drawing files will made available].
 - 6. The following digital data files will be furnished for each appropriate discipline:
 - a. Floor plans.
 - b. Reflected ceiling plans.

- B. Web-Based Project Software: Provide, administer, and use 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. Calendar: Scheduling for meetings.
 - g. Procedures for handling PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.
 - h. Processing and tracking of payment applications.
 - i. Processing and tracking of contract modifications.
 - j. Creating and distributing meeting minutes.
 - k. Document management for Drawings, Specifications, and coordination drawings, including revision control.
 - l. Management of construction progress photographs.
 - m. Mobile device compatibility, including smartphones and tablets.
 2. Provide up to seven web-based Project software user licenses for use of Owner, Owner's Commissioning Authority, Architect, and Architect's consultants. Provide eight hours of software training at Architect's office for web-based Project software users.
 3. 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.
 4. Provide the following web-based Project software packages under their current published licensing agreements:
 - a. Procore Technologies, Inc.
- 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 specification section number and contractor's 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.

1.08 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All 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. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing and long-lead items.
 - d. Designation of key personnel and their duties.
 - e. Procedures for processing field decisions and Change Orders.
 - f. Procedures for RFIs.
 - g. Procedures for testing and inspecting.
 - h. Procedures for processing Applications for Payment.
 - i. Distribution of the Contract Documents.
 - j. Submittal procedures.
 - k. Preparation of As-Built Documents.
 - l. Use of the premises and existing building.
 - m. Work restrictions.
 - n. Owner's occupancy requirements.
 - o. Responsibility for temporary facilities and controls.
 - p. Construction waste management and recycling.
 - q. Office, work, and storage areas.
 - r. Equipment deliveries and priorities.
 - s. First aid.
 - t. Security.
 - u. Working hours.
 3. Minutes: Architect will record and distribute Pre-Construction Meeting minutes electronically via web-based Project software.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect 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. The Contract Documents.

- b. Options.
 - c. Related RFIs.
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Review of mockups.
 - i. Possible conflicts.
 - j. Compatibility problems.
 - k. Time schedules.
 - l. Weather limitations.
 - m. Manufacturer's written recommendations.
 - n. Warranty requirements.
 - o. Compatibility of materials.
 - p. Acceptability of substrates.
 - q. Temporary facilities and controls.
 - r. Space and access limitations.
 - s. Regulations of authorities having jurisdiction.
 - t. Testing and inspecting requirements.
 - u. Installation procedures.
 - v. Coordination with other work.
 - w. Required performance results.
 - x. Protection of adjacent work.
 - y. Protection of construction and personnel.
 - 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 - 4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
 - 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. Progress Meetings: Architect will conduct progress meetings at weekly intervals. Coordinate dates of meetings with preparation of payment requests.
- 1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 2. 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.
 - 2) Provide a three week outlook schedule for planning and review of current weekly progress.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.

- 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Status of correction of deficient items.
 - 14) Field observations.
 - 15) 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.
3. Minutes: Architect will record and distribute to Contractor and Owner/Architect the meeting minutes electronically through the web-based Project software.
4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
 - 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. Contractor is required to provide a three-week look ahead schedule for each Progress Meeting.
- E. Coordination Meetings: Conduct Project coordination meetings at weekly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
 1. Attendees: In addition to representatives of Owner and 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 conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to Combined Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - b. Schedule Updating: Revise Combined Contractor's Construction Schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
 - c. Review present and future needs of each contractor present, including the following:
 - 1) Interface requirements.

- 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Change Orders.
3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 31 00

This page intentionally left blank

REQUEST FOR INFORMATION

Contractor's Project No. _____ Date: _____ RFI No. _____
Contractor: _____ Project Name: _____
Architect's Project No.: _____ School District: _____

REQUEST FOR INFORMATION:

Ref: Specification Section No(s): _____ Drawing No(s): _____

CONTRACTOR

BY

DATE

ARCHITECT'S/ENGINEER'S RESPONSE:

BLRB ARCHITECTS, P.S.

ARCHITECT

BY

DATE

CONSULTANT FIRM

BY

DATE

THIS IS NOT AUTHORIZATION TO PROCEED WITH WORK INVOLVING ADDITIONAL COSTS AND/OR TIME.

SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.01 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.
- B. Related Requirements:
 - 1. Division 01 Section "Quality Requirements" for schedule of tests and inspections.
 - 2. Division 01 Section "Payment Procedures" for schedule of values and requirements for use of cost-loaded schedule for Applications for Payment.

1.02 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 the critical path of Project and when activities can be performed.
- 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.

1.03 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 - 1. Working electronic copy of schedule file.
 - 2. PDF file.
- B. Startup construction schedule.
- 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.
- 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 the Notice to Proceed 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.

1.04 QUALITY ASSURANCE

- A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's Construction Schedule, including, but not limited to, the following:
 - 1. Review software limitations and content and format for reports.
 - 2. Verify availability of qualified personnel needed to develop and update schedule.
 - 3. Discuss constraints, including phasing, work stages, interim milestones and partial Owner occupancy.
 - 4. Review delivery dates for Owner-furnished products.
 - 5. Review schedule for work of Owner's separate contracts.
 - 6. Review submittal requirements and procedures.
 - 7. Review time required for review of submittals and resubmittals.

8. Review requirements for tests and inspections by independent testing and inspecting agencies.
9. Review time required for Project closeout and Owner startup procedures, including commissioning activities.
10. Review and finalize list of construction activities to be included in schedule.
11. Review procedures for updating schedule.

1.05 COORDINATION

- A. Coordinate Contractor's Construction Schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
 1. Secure time commitments for performing critical elements of the Work from entities involved.
 2. Coordinate each construction activity in the network with other activities, and schedule them in proper sequence.

1.06 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.
 1. In-House Option: Owner may waive requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.
 2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.
- B. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Substantial 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. Temporary Facilities: Indicate start and completion dates for the following as applicable:
 - a. Securing of approvals and permits required for performance of the Work.
 - b. Temporary facilities.
 - c. Construction of mock-ups, prototypes and samples.
 - d. Owner interfaces and furnishing of items.
 - e. Interfaces with Separate Contracts.
 - f. Regulatory agency approvals.
 - g. Punch list.
 3. Procurement Activities: Include procurement process activities for the following long lead-time items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 4. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
 5. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
 6. Commissioning Time: Include no fewer than 15 days for commissioning.

7. 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.
 8. 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. Phasing: Arrange list of activities on schedule by phase.
 2. Work under More Than One Contract: Include a separate activity for each contract.
 3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 5. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 6. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Substantial Completion.
 - e. Use-of-premises restrictions.
 - f. Seasonal variations.
 - g. Environmental control.
 7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Subcontract awards.
 - b. Submittals.
 - c. Purchases.
 - d. Mockups.
 - e. Fabrication.
 - f. Sample testing.
 - g. Deliveries.
 - h. Installation.
 - i. Tests and inspections.
 - j. Adjusting.
 - k. Curing.
 - l. Startup and placement into final use and operation.
 - m. Commissioning.
- E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion, and the following interim milestones:
1. Temporary enclosure and space conditioning.
- 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.

1.07 STARTUP CONSTRUCTION SCHEDULE

- A. Gantt-Chart Schedule: Submit startup, horizontal, Gantt-chart-type construction schedule within seven days of date established for the Notice to Proceed.
- 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.

1.08 CPM SCHEDULE REQUIREMENTS

- A. Prepare network diagrams using AON (activity-on-node) format.
- B. Startup Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- C. CPM Schedule: Prepare Contractor's Construction Schedule using a cost- and resource-loaded, time-scaled CPM network analysis diagram for the Work.
1. Develop network diagram in sufficient time to submit CPM schedule, so it can be accepted for use no later than 60 days after date established for the Notice to Proceed.
 - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates.

2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
 3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
 4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule to coordinate with the Contract Time.
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.
1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
 - a. Preparation and processing of submittals.
 - b. Mobilization and demobilization.
 - c. Purchase of materials.
 - d. Delivery.
 - e. Fabrication.
 - f. Utility interruptions.
 - g. Installation.
 - h. Work by Owner that may affect or be affected by Contractor's activities.
 - i. Testing and inspection.
 - j. Commissioning.
 - k. Punch list and Final Completion.
 - l. Activities occurring following Final Completion.
 2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
 3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
 4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
 - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
 5. Cost- and Resource-Loading of CPM Schedule: Assign cost to construction activities on the CPM schedule. Do not assign costs to submittal activities. Obtain Architect's approval prior to assigning costs to fabrication and delivery activities. Assign costs under main subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project record documents, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.
 - a. Each activity cost shall reflect an appropriate value subject to approval by Architect.
 - b. Total cost assigned to activities shall equal the total Contract Sum.
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall Project schedule.
- F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated

reports showing the following:

1. Contractor or subcontractor and the Work or activity.
2. Description of activity.
3. Main events of activity.
4. Immediate preceding and succeeding activities.
5. Early and late start dates.
6. Early and late finish dates.
7. Activity duration in workdays.
8. Total float or slack time.
9. Average size of workforce.
10. Dollar value of activity (coordinated with the schedule of values).

G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

1. Identification of activities that have changed.
2. Changes in early and late start dates.
3. Changes in early and late finish dates.
4. Changes in activity durations in workdays.
5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time.

H. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.

1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
 - a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
 - b. Submit value summary printouts one week before each regularly scheduled progress meeting.

1.09 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. Emergency procedures.
13. Orders and requests of authorities having jurisdiction.

14. Change Orders received and implemented.
 15. Construction Change Directives received and implemented.
 16. Services connected and disconnected.
 17. Equipment or system tests and startups.
 18. Partial completions and occupancies.
 19. Substantial Completions authorized.
- B. Material Location Reports: At 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.
- 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.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 32 00

SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Submittal schedule requirements.
 - 2. Administrative and procedural requirements for submittals.
- B. Related Requirements:
 - 1. Division 01 Section "Payment Procedures" for submitting Applications for Payment and the schedule of values.
 - 2. Division 01 Section "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
 - 3. Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
 - 4. Division 01 Section "Photographic Documentation" for submitting preconstruction photographs, periodic construction photographs, and Final Completion construction photographs.
 - 5. Division 01 Section "Quality Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
 - 6. Division 01 Section "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
 - 7. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
 - 8. Division 01 Section "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
 - 9. Division 01 Section "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.02 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."

1.03 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 Schedule: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal Schedule: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule as required to reflect changes in current status and timing for submittals.
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.

1.04 SUBMITTAL FORMATS

- A. Submittal Information: Include the following information in each submittal:
1. Project name.
 2. Date.
 3. Name of Architect.
 4. Name of Contractor.
 5. Name of firm or entity that prepared submittal.
 6. Names of subcontractor, manufacturer, and supplier.
 7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier and alphanumeric suffix for resubmittals.
 - a. Section number followed by a decimal point and then a sequential number (e.g., 033000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 033000.01.A).
 8. Category and type of submittal.
 9. Submittal purpose and description.
 10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
 11. Drawing number and detail references, as appropriate.
 12. Indication of full or partial submittal.
 13. Location(s) where product is to be installed, as appropriate.
 14. Other necessary identification.
 15. Remarks.
 16. Signature of transmitter.
- B. Options: Identify options requiring selection by Architect.
- C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each

submittal or noting on attached separate sheet.

- D. Electronic Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

1.05 SUBMITTAL PROCEDURES

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
1. Email: Prepare submittals as PDF package and transmit to Architect by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Architect.
 - a. Architect will return annotated file. Annotate and retain one copy of file as a digital Project Record Document file.
- B. 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.
- 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.

1.06 CONTRACTOR'S USE OF ARCHITECT'S ELECTRONIC FILES

- A. General: At Contractor's written request, copies of Architect's BIM files will be provided to Contractor for Contractor's use in connection with Project, subject to the following conditions:
 - 1. Architect will release BIM information for use with Shop Drawing submittals following receipt of signed media release available through the Architect's office. Media release shall be signed by Contractor and subcontractor requesting electronic media.
 - a. Execution of Agreement: After agreement is signed the Architect/Engineer will transmit drawings requested via e-mail or through a secured FTP site.
 - b. Contractor will be responsible for the transfer, accuracy, completeness, suitability and management of electronic media for submittal procedures as outlined by this Specification.

1.07 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 concurrently with Samples.
- B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless submittal based on Architect's digital data drawing files is otherwise permitted.
 - 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.

- c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
 2. BIM Incorporation: Develop and incorporate Shop Drawing files into BIM established for Project.
- C. Samples: Submit Samples for review of type, color, pattern, and texture for a check of these characteristics with other materials.
 1. Transmit Samples that contain multiple, related components, such as accessories together in one submittal package.
 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
 - a. Project name and submittal number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.
 - f. Specification paragraph number and generic name of each item.
 3. Email Transmittal: Provide PDF transmittal. Include digital image file illustrating Sample characteristics and identification information for record.
 4. Physical Samples: To show materials and finishes specified and sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line, including complete submittal information indicated.
 - a. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side that includes the following:
 - 1) Generic description of Sample.
 - 2) Product name or name of manufacturer.
 - 3) Sample source.
 5. 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.
 6. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units, showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
 7. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of

repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

- a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- 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 AWS B2.1/B2.1M 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 substrate preparation and primers required.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - a. Name of evaluation organization.
 - b. Date of evaluation.
 - c. Time period when report is in effect.
 - d. Product and manufacturers' names.
 - e. Description of product.
 - f. Test procedures and results.
 - g. Limitations of use.

1.08 DELEGATED DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.
- C. BIM Incorporation: Incorporate delegated design drawing and data files into BIM established for Project.
 1. Prepare delegated design drawings in the following format: Same digital data software program, version, and operating system as original Drawings.

1.09 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 a uniform approval stamp. 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.

1.10 ARCHITECT'S REVIEW

- A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return.
 - 1. PDF Submittals: Architect will indicate, via markup on each submittal, the appropriate action.
- 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.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 33 00

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality assurance and control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality assurance and control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
 - 4. Specific test and inspection requirements are not specified in this Section.
- C. Related Sections include the following:
 - 1. Division 01 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
 - 2. Division 01 Section "Execution" for cutting and patching for repair and restoration of construction disturbed by testing and inspecting activities.
 - 3. Divisions 02 through 33 Sections for specific test and inspection requirements.

1.02 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
 - 1. Laboratory Mockups: Full-size physical assemblies constructed 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 indicated in-place portions of permanent construction, consisting of multiple products, assemblies, and

- subassemblies, with cutaways enabling inspection of concealed portions of the Work.
 - a. Include each system, assembly, component, and part of the exterior wall and roof to be constructed for the Project. Colors of components shall be those selected by the Architect for use in the Project.
 - 3. Room Mockups: Mockups of typical classroom complete with wall, floor, and ceiling finishes; doors; windows; millwork; casework; specialties; furnishings and equipment; and lighting.
 - 4. Product Mockups: Mockups that may include multiple products, materials, or systems specified in a single Section.
 - 5. In-Place Mockups: Mockups constructed on-site in their actual final location as part of permanent construction.
 - D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
 - E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
 - F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
 - G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
 - H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
 - I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.
 - J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- 1.03 DELEGATED-DESIGN SERVICES
- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
 - B. Delegated-Design Services Statement: Submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated.

Include list of codes, loads, and other factors used in performing these services.

1.04 CONFLICTING REQUIREMENTS

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

1.05 ACTION SUBMITTALS

- A. Mockup Shop Drawings: For integrated exterior mockups.
 - 1. Include plans, sections, elevations, and details, indicating materials and size of mockup construction.
 - 2. Indicate manufacturer and model number of individual components.
 - 3. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.06 INFORMATIONAL SUBMITTALS

- A. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:
 - 1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Architect.
 - 2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Architect.
- B. Qualification Data: 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.
- C. 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.
- D. Reports: Prepare and submit certified written reports and documents as specified.
- E. 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.

1.07 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 - 12. Name and signature of laboratory inspector.
 - 13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Field Reports: Prepare written information documenting tests and inspections specified in other Sections. Include the following:
 - 1. Name, address, and telephone number of representative making report.
 - 2. Statement on condition of substrates and their acceptability for installation of product.
 - 3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 - 4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 - 5. Other required items indicated in individual Specification Sections.

1.08 QUALITY ASSURANCE

- A. Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those

performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 - 1. Requirement for specialists shall not supersede building codes and regulations governing the Work.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
 - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Factory-Authorized Service 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. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following Contractor's responsibilities, including the following:
 - 1. Provide test specimens representative of proposed products and construction.
 - 2. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - 3. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - 4. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
 - 5. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - 6. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.
 - 7. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
 - 2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 - 3. Employ supervisory personnel who will oversee mockup construction. Employ workers who will be employed to perform same tasks during the construction at Project.
 - 4. Demonstrate the proposed range of aesthetic effects and workmanship.

5. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
 6. Approval of mockups by the Architect does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 7. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 8. Demolish and remove mockups when directed unless otherwise indicated.
- K. Integrated Exterior Mockups: Construct integrated exterior mockup according to approved Shop Drawings or as indicated. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials. Comply with requirements in "Mockups" Paragraph.
1. Coordinate construction of the mockup to allow observation of air barrier installation, flashings, air barrier integration with fenestration systems, and other portions of the building air/moisture barrier and drainage assemblies, prior to installation of veneer, cladding elements, and other components that will obscure the work.
 2. See Division 01 Section "Air Barrier System Quality Control Requirements."
- L. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Specification Sections.

1.09 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. 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.
1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation,

including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."

- D. 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.
- E. Testing Agency Responsibilities: Cooperate with Architect, Commissioning Authority and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 - 1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 - 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 - 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 - 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 - 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 - 6. Do not perform any duties of Contractor.
- F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 - 1. Access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 - 4. Facilities for storage and field curing of test samples.
 - 5. Delivery of samples to testing agencies.
 - 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 - 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- H. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Submit schedule within 30 days of date established for the Notice to Proceed.
 - 1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.10 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner.

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

1.11 CONCRETE SLAB MOISTURE TESTING

- A. Scope: Owner's testing lab will test moisture content of concrete floor slabs which will receive finish flooring using the following methods.
- B. Moisture Testing: Lab will perform moisture tests on floor substrate by two methods and where both testing procedures are required;
1. First Test Method: One-half of the concrete area by ASTM F-1869 Desiccant method (MVER) with anhydrous calcium chloride testing; one test per 1,000 sq. ft., on weekly basis during minimum 90 day drying period prior to scheduled flooring installation.
 2. Second test method, test floor areas to be finished no less than 1 week and not more than (3) weeks prior to scheduled installation. Within the scheduled time period indicated above, test the floor area using the In-Situ Relative Humidity testing method per ASTM F-2170 (RH).
- C. pH Levels: Using ASTM F-710 at each test site, also test levels of pH, after removal of test containment dome. Place several drops of water and form a puddle 1 inch in diameter and allow to set for 60 seconds. Dip the pH paper into water and remove immediately and compare readings to pH chart. Report findings to Owner, Architect, and Contractor. Provide 1 test per 1,000 SF of floor surface.
1. pH level (pH): Must be in range which is acceptable to flooring manufacturer.
- D. Coordination: Document and distribute test results to Contractor, Owner and Architect. Testing will be scheduled by the General Contractor. Subcontractor testing is not considered approved testing.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 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.

3.02 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
 2. Comply with the Contract Document requirements for cutting and patching in Division 01 Section "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.

3.03 SPECIAL CONCRETE MOISTURE TESTING

- A. Inspection of Conditions: Require installer of each Work component to inspect both substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in acceptable manner. Initiation of installation will confirm installer's acceptance of workplace for Work to proceed. Comply with the requirements indicated and schedule the testing outlined below with Owner's testing lab.
1. Slab Moisture: Owner's testing lab will monitor moisture content of concrete floor slabs which receive finish flooring, such as wood, vinyl composition tile, vinyl tile, vinyl sheet, linoleum, carpet, resinous flooring, and special flooring. Lab shall perform moisture tests on floor substrate; one test per 1,000 sq. ft., on weekly basis during minimum ninety (90) day drying period prior to scheduled flooring installation. Test floor areas to be finished no less than (1) one week and not more than (3) weeks prior to scheduled installation. Within the scheduled time period indicated above, test the area using the In-Situ Relative Humidity testing method per ASTM F-2170-02.
 - a. If moisture content of slab exceeds flooring manufacturer's required limits for relative humidity levels; the General Contractor shall provide additional drying to reduce moisture in the concrete. Provide such additional methods as closing off areas and using ventilating, heating, and/or dehumidifying equipment, or other acceptable procedures as necessary to achieve maximum limits in time for scheduled flooring installation. Review drying procedures and schedule with Architect prior to implementation of mechanical drying methods. Cracking, crazing, curling, or related damage to concrete from overly aggressive application of drying or heating techniques will require replacement of concrete slabs. Install no finish flooring on slabs until relative humidity in concrete has been reported to be in compliance with the above criteria.
 2. pH Levels: At each test site (as specified above for slab moisture) also test levels of pH, after removal of test containment dome. Place several drops of water and form a puddle 1" in diameter and allow to set for 60 seconds. Dip the pH paper into water and remove immediately and compare readings to pH chart

Beaverton SD Facility Office Renovation
Beaverton School District
BLRB Project No.: 23030

Permit/Bid Set
April 17, 2023

Report findings to Owner/Architect.

END OF SECTION 01 40 00

SECTION 01 42 00 - REFERENCES

PART 1 - GENERAL

1.01 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.

1.02 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.

1.03 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."
- B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.
1. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
 2. ICC - International Code Council; www.iccsafe.org.
 3. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.
- C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up-to-date as of the date of the Contract Documents.
1. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
 2. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
 3. DOE - Department of Energy; www.energy.gov.
 4. EPA - Environmental Protection Agency; www.epa.gov.
 5. GSA - General Services Administration; www.gsa.gov.
 6. OSHA - Occupational Safety & Health Administration; www.osha.gov.
 7. TRB - Transportation Research Board; National Cooperative Highway Research Program; www.trb.org.
 8. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
- D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
 2. FED-STD - Federal Standard; (See FS).
 3. FS - Federal Specification; Available from Department of Defense Single Stock Point; <http://dodssp.daps.dla.mil>.
 4. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).
- E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 42 00

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 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. Division 01 Section "Substitution Procedures" for requests for substitutions.
 - 2. Division 01 Section "References" for applicable industry standards for products specified.
 - 3. Division 01 Section "Closeout Procedures" for submitting warranties for Contract closeout.
 - 4. Divisions 02 through 49 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.02 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.03 ACTION SUBMITTALS

- A. Product List: Submit a list, in tabular form, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.
 - 1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.

2. Form: Tabulate information for each product under the following column headings:
 - a. Specification Section number and title.
 - b. Generic name used in the Contract Documents.
 - c. Proprietary name, model number, and similar designations.
 - d. Manufacturer's name and address.
 - e. Supplier's name and address.
 - f. Installer's name and address.
 - g. Projected delivery date or time span of delivery period.
 - h. Identification of items that require early submittal approval for scheduled delivery date.
 3. Initial Submittal: Within 30 days after date of commencement of the Work, submit 3 copies of initial product list. Include a written explanation for omissions of data and for variations from Contract requirements.
 - a. At Contractor's option, initial submittal may be limited to product selections and designations that must be established early in Contract period.
 4. Completed List: Within 60 days after date of commencement of the Work, submit 3 copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
 5. Architect's Action: Architect will respond in writing to Contractor within 15 days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.
- B. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
 2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Division 01 Section "Submittal Procedures."
 - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.
- 1.04 QUALITY ASSURANCE
- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. 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. Store cementitious products and materials on elevated platforms.
 - 5. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 - 6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 - 7. Protect stored products from damage and liquids from freezing.
 - 8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.06 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. Refer to Divisions 02 through 33. Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.01 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Architect will make selection.
 5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
 6. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 7. Or Approved: For products specified by name and accompanied by the term "or approved," or "or approved by Architect," or comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures:
1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
 4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
 5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
 6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
 7. Basis-of-Design Product: Where Specifications name a product, 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.

8. 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.
 - a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
 - b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.02 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
 1. Comparable Products Evaluation: It is the submitter of the comparable product(s) responsibility to provide sufficient product data, testing, shop drawings, samples, and other information to justify the comparability of the product with the "Basis of Design." The Architect will review, and respond with his opinion as to the comparability of the submitted product in conformance with time requirements stipulated in Division 01 Section "Submittal Procedures".
 2. Evidence that the proposed product does not require revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 3. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 4. Evidence that proposed product provides specified warranty.
 5. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 6. Samples, if requested.

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 60 00

This page intentionally left blank

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Installation of the Work.
 - 3. Cutting and patching.
 - 4. Coordination of Owner-installed products.
 - 5. Progress cleaning.
 - 6. Starting and adjusting.
 - 7. Protection of installed construction.
 - 8. Correction of the Work.
- B. Related Sections include the following:
 - 1. Division 01 Section "Project Management and Coordination."
 - 2. Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.02 QUALITY ASSURANCE

- A. Professional Engineer Qualifications: Refer to Division 01 Section 01 "Quality Requirements."
- B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 - 1. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of specified products and equipment.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
 - 1. Before construction, verify the location and points of connection of utility services.

- B. Existing Utilities: 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; and underground electrical services.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- C. Acceptance of Conditions: 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. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - a. Description of the Work.
 - b. List of detrimental conditions, including substrates.
 - c. List of unacceptable installation tolerances.
 - d. Recommended corrections.
 - 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.02 PREPARATION

- A. 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.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.03 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.

3.04 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 8 feet in spaces without a suspended ceiling.
- 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. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by 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.
- H. 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.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.05 CUTTING AND PATCHING

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

- C. Temporary Support: Provide temporary support of Work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
 - 5. Proceed with patching after construction operations requiring cutting are complete.
- F. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as practicable, as judged by Architect. Provide materials and comply with installation requirements specified in other Sections, where applicable.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - 3. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 - 4. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure and vapor barrier.
- G. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.06 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction forces.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces.
 - 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 forces at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

3.07 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. 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 materials more than 7 days during normal weather or 3 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.
- 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.
 - 1. Before installation of gypsum board, thoroughly vacuum wall cavities and stud tracks.
- 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: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.08 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- 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: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 01 Section "Quality Requirements."

3.09 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. Comply with manufacturer's written instructions for temperature and relative humidity.

3.10 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 73 00

SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Recycling nonhazardous construction waste.
 - 2. Disposing of nonhazardous construction waste.
- B. Related Requirements:
 - 1. Division 01 Section "Temporary Facilities and Controls" for environmental-protection measures during construction.
 - 2. Section 02 "Selective Demolition" for disposition of waste resulting from partial demolition of buildings.

1.02 DEFINITIONS

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

1.03 PERFORMANCE GOALS

- A. Salvage/Recycle Goals: Owner's goal is to salvage and recycle as much nonhazardous construction waste as possible including the following materials: (Some of these items may not be included in this specific project.)
 - 1. Construction Waste:
 - a. Site-clearing waste.
 - b. Masonry.
 - c. Lumber.
 - d. Wood sheet materials.
 - e. Wood trim.
 - f. Metals.
 - g. Roofing.
 - h. Insulation.
 - i. Carpet.
 - j. Gypsum board.
 - k. Piping.
 - l. Electrical conduit.
 - m. Packaging: Regardless of salvage/recycle goal indicated above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
 - 1) Paper.
 - 2) Cardboard.

- 3) Boxes.
- 4) Plastic sheet and film.
- 5) Polystyrene packaging.
- 6) Wood crates.
- 7) Plastic pails.

1.04 ACTION SUBMITTALS

- A. Waste Management Plan: Submit plan within 30 days of date established for the Notice to Proceed.

1.05 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. 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.

1.06 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Waste Management Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "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 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.

1.07 WASTE MANAGEMENT PLAN

- A. General: Develop plan consisting of waste identification, waste reduction work plan, and cost/revenue analysis. Include separate sections in plan for demolition and construction waste. 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 construction waste generated by the Work. 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. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
- D. Forms: Prepare waste management plan on forms.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 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 Division 01 Section "Temporary Facilities and Controls" for operation, termination, and removal requirements.
- 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 occurring at Project site.
 - 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, recycled, reused, donated, and sold.
 - 2. Comply with Division 01 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.02 RECYCLING CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. 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 they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

- a. Inspect containers and bins for contamination and remove contaminated materials if found.
2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

3.03 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 2. Polystyrene Packaging: Separate and bag materials.
 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Site-Clearing Wastes: Chip brush, branches, and trees on-site or at landfill facility
- C. Wood Materials:
 1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
- D. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.
 1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

3.04 DISPOSAL OF WASTE

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

END OF SECTION 01 74 19

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion.
 - 2. Inspection procedures.
 - 3. Final completion.
 - 4. Warranties.
 - 5. Final cleaning.
 - 6. Repair of the Work.
- B. Related Sections include the following:
 - 1. Division 01 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
 - 2. Division 01 Section "Photographic Documentation" for submitting Final Completion construction photographs and negatives.
 - 3. Division 01 Section "Execution" for progress cleaning of Project site.
 - 4. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 5. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 6. Division 01 Section "Demonstration and Training" for requirements for instructing Owner's personnel.
 - 7. Divisions 02 through 49 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.02 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
 - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - 2. Advise Owner of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
 - 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 - 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 - 8. Complete startup testing of systems.

9. Submit test/adjust/balance records.
10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Advise Owner of changeover in heat and other utilities.
12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
13. Complete final cleaning requirements, including touchup painting.
14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

1.03 INSPECTION PROCEDURES

- A. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.04 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
 2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Submit pest-control final inspection report and warranty.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training videotapes.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.05 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, listed by room or space number.
2. Organize items applying to each space by major element, including categories for ceilings, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.
4. Submit list of incomplete items in the following format:
 - a. Web-Based Project Software Upload: Utilize software feature for creating and updating list of incomplete items (punch list).

1.06 SUBMITTAL OF PROJECT WARRANTIES

- A. Submit warranties on the appropriate form attached at the end of this document.
 1. Special Project Warranty (work) Form.
 2. Special Project Warranty (product) Form.
 3. Warranty Action Form.
- B. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- C. 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.
- D. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual. Provide in PDF or paper format as preferred by Owner.
- E. 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 on digital media acceptable to Architect by uploading to web-based project software site or other prearranged method of delivery.
- F. Warranties in Paper Form:
 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and phone number of Installer.
 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- G. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.01 MATERIALS

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

PART 3 - EXECUTION

3.01 FINAL CLEANING

- A. General: Provide 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 portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Sweep concrete floors broom clean in unoccupied spaces.
 - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo 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. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - k. Remove labels that are not permanent.
 - l. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - m. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - n. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

- o. Replace parts subject to unusual operating conditions.
 - p. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - q. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - r. Clean ducts, blowers, and coils if units were operated without filters during construction.
 - s. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - t. Leave Project clean and ready for occupancy.
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.
- D. 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.

3.02 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 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

This page intentionally left blank

SPECIAL PROJECT WARRANTY (work)

SCHOOL _____

PROJECT WARRANTY FOR _____

WHEREAS, _____ (Contractor),

Address _____

Telephone _____ - _____ - _____ Ext. _____ has performed _____

(Work) on the following project: _____

Address _____

For _____

Address _____

WHEREAS, the Contractor has agreed to warrant said Work _____

NOW, therefore, the Contractor hereby acknowledges warranty for said work in accordance with the terms hereof, complying with the terms of the Contract with the Owner dated _____ that _____

WARRANTY PERIOD _____, Starting _____, Terminating _____

IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____,

20 _____ for Contractor _____

as its _____ (position).

Name of Firm _____

Address _____

SPECIAL PROJECT WARRANTY (product)

SCHOOL _____

SPECIAL PROJECT WARRANTY FOR _____

WHEREAS, _____ (Manufacturer),

Address _____

Telephone _____ - _____ - _____ Ext. _____ has furnished/provided _____

_____ (product) on the following project: _____

Installed by _____ (Subcontractor),

Address _____

Constructed by _____ (Contractor),

Address _____

For _____ (Owner),

Address _____

WHEREAS, the Manufacturer, through the Contractor has agreed to warrant said product _____

NOW, therefore, the Contractor hereby acknowledges warranty for said work in accordance with the terms hereof, complying with the terms of the Contract with the Contractor and the Owner dated _____ that _____

WARRANTY PERIOD _____, Starting _____, Terminating _____

IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____

20 _____ for Manufacturer _____ (name/position),

for Subcontractor _____ (name/position).

And has been countersigned in accordance with terms and conditions for the Contractor _

_____ (name/position).

WARRANTY ACTION FORM

SCHOOL DISTRICT:

Date: _____

Warranty Action No.: _____

TO:

Company Name _____ Phone No. _____

Address: _____ Fax No. _____

Attention: _____ Subject/Project: _____

Priority: URGENT _____ ROUTINE _____

The contractor is directed to rectify the following warranty issue in accordance with General and Supplementary Conditions.

(Substantial Completion Date _____ / Warranty Termination Date _____)

Issued By: _____ Date: _____.

Reply requested within five (5) days of notice. **Urgent** notice within twenty-four (24) hours.

REPLY: _____

Correction Action Scheduled: _____(date) _____(time)

Correction Completed: _____(date) _____(time)

Executed By: _____(name of firm) _____(initials)

District Signature:_____ Date: _____

Cc: BLRB

Engineer: Mech_____ Elec_____ Civil_____

File

ARCHITECTURAL PUNCHLIST

OWNER:
Project:
BLRB Project No.:

Date:
Inspected by:
Re-inspected by:

BLRB architects		GC: Contractor			
Room #/Location:	SUBCONTRACTOR OR COMPANY RESPONSIBLE	SIGN-OFF / ACCEPT			
		GC		A/E	
		INITIAL	DATE	INITIAL	DATE
General Notes:					
1.					
2.					
3.					
Floor:					
4.					
5.					
6.					
Ceiling:					
7.					
8.					
9.					
Door:					
10.					
11.					
12.					
North Wall:					
13.					
14.					
15.					
16.					
East Wall:					
17.					
18.					
19.					
20.					
South Wall:					
21.					
22.					
23.					
24.					
West Wall:					
25.					
26.					
27.					
28.					

This page intentionally left blank

SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.01 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. Division 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
 - 2. Division 01 Section "General Commissioning Requirements" for verification and compilation of data into operation and maintenance manuals.

1.02 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.

1.03 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 and Commissioning Authority 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 by uploading to web-based project software site. Enable reviewer comments on draft submittals.
 - 2. Submit one paper copy.
- C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect and Commissioning Authority 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 and Commissioning Authority will return copy with comments.
 - 1. Correct or revise each manual to comply with Architect's and Commissioning Authority's comments. Submit copies of each corrected manual within 15 days of

receipt of Architect's and Commissioning Authority's comments and prior to commencing demonstration and training.

- E. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.04 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 or post-type binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. 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.

1.05 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 Construction Manager.
 - 7. Name and contact information for Architect.
 - 8. Name and contact information for Commissioning Authority.
 - 9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
 - 10. 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."

1.06 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.

1.07 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.

1.08 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.

1.09 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.

1.10 PRODUCT MAINTENANCE MANUALS

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

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 78 23

This page intentionally left blank

SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 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. Division 01 Section "Execution" for final property survey.
 - 2. Division 01 Section "Closeout Procedures" for general closeout procedures.
 - 3. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.02 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 PDF electronic files of scanned record prints and one set(s) of file prints.
 - 2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
 - b. Final Submittal:
 - 1) Submit PDF electronic files of scanned Record Prints and three set(s) of file prints.
 - 2) Print each drawing, 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.

1.03 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 Change Directive.
 - k. Changes made following Architect's written orders.
 - l. Details not on the original Contract Drawings.
 - m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically.
 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 4. Mark record prints with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. 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 for the original Contract Drawings.
 2. Format: Annotated PDF electronic file with comment function enabled.
 3. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
 4. Refer instances of uncertainty to Architect for resolution.
 5. Architect will furnish Contractor with one set of digital data files of the Contract Drawings for use in recording information.
 - a. See Division 01 Section "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.

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.

1.04 RECORD SPECIFICATIONS

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

1.05 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.

1.06 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.

1.07 MAINTENANCE OF RECORD DOCUMENTS

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

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 78 39

SECTION 01 79 00 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.01 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.
- B. Unit Price for Instruction Time: Length of instruction time will be measured by actual time spent performing demonstration and training in required location. No payment will be made for time spent assembling educational materials, setting up, or cleaning up.

1.02 INFORMATIONAL SUBMITTALS

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

1.03 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 paper and PDF file format required for operation and maintenance manuals specified in Section 017823 "Operation and Maintenance Data."

1.04 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 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required.
- D. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:
 1. Inspect and discuss locations and other facilities required for instruction.
 2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
 3. Review required content of instruction.
 4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.05 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.

1.06 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.

1.07 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 Division 01 Section "Operation and Maintenance Data."
- B. Set up instructional equipment at instruction location.

1.08 INSTRUCTION

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

1.09 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

- A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
 - 1. At beginning of each training module, record each chart containing learning objective and lesson outline.
- B. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full HD mode.
 - 1. Submit video recordings by uploading to web-based Project software site.
 - 2. File Hierarchy: Organize folder structure and file locations according to Project Manual table of contents. Provide complete screen-based menu.
 - 3. File Names: Utilize file names based on name of equipment generally described in video segment, as identified in Project specifications.
 - 4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the equipment demonstration and training recording that describes the following for each Contractor involved on the Project, arranged according to Project Manual table of contents:
 - a. Name of Contractor/Installer.
 - b. Business address.
 - c. Business phone number.
 - d. Point of contact.
 - e. Email address.
- C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.
 - 1. Film training session(s) in segments not to exceed 15 minutes.
 - a. Produce segments to present a single significant piece of equipment per segment.
 - b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
 - c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.
- D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.
 - 1. Furnish additional portable lighting as required.
- E. Narration: Describe scenes on video recording by audio narration by microphone while video recording is recorded. Include description of items being viewed.
- F. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.
- G. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 79 00

SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Demolish and remove components and assemblies of existing walls, as indicated on Drawings.
 - 2. Salvage of existing items to be reused or recycled.
- B. Related Sections:
 - 1. Division 00 Sections for hazardous materials to be abated or removed prior to start of demolition and construction.
 - 2. Division 01 Section "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.

1.02 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

1.03 MATERIALS OWNERSHIP

- A. Except as otherwise specified or indicated on Drawings, demolition waste becomes property of Contractor.

1.04 INFORMATIONAL SUBMITTALS

- A. 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.
 - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
- B. Predemolition Photographs and/or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Submit before Work begins.
- C. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.05 CLOSEOUT SUBMITTALS

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

1.06 FIELD CONDITIONS

- A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- C. Hazardous Materials: Present in buildings and structures to be selectively demolished. See Division 00 Section "Existing Hazardous Material Information." 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.
- D. Storage or sale of removed items or materials on-site is not permitted.
- E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

PART 2 - PRODUCTS

2.01 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.
- C. Catalog and document: waste stream of materials, separated by type and materials recycled that are diverted from waste stream.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. 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.
- B. Verify that hazardous materials have been remediated before proceeding with building demolition operations.
- C. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.

1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.

3.02 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. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 3. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 01 Section "Construction Facilities and Temporary Controls."
- B. Remove temporary barricades and protections where hazards no longer exist.

3.03 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. 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.
 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 3. Dispose of demolished items and materials promptly. Recycle to the greatest extent possible.
- 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 for Reinstallation: Rubber base to be reinstallation above new resilient athletic flooring.
 1. Carefully remove, clean and repair items to functional condition adequate for intended reuse.
 2. Protect items from damage during removal and storage.
 3. Reinstall items in locations indicated. Provide materials necessary for reinstallation; use adhesives recommended by manufacturer's of rubber base.

3.04 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

3.05 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and recycle or dispose of them according to Division 01 Section "Construction Facilities and Temporary Controls" and

"Contract Closeout."

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. Comply with requirements specified in Division 01 Section "Construction Facilities and Temporary Controls" and "Contract Closeout."

B. Burning: Do not burn demolished materials.

3.06 CLEANING

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

3.07 SELECTIVE DEMOLITION NOTES

- A. Refer to Architectural Drawings for complete demolition notes.

END OF SECTION 02 41 19

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.
- B. Related Requirements:
 - 1. Division 03 Section "Ground and Polished Concrete" for concrete floors scheduled to receive a polished or burnished concrete finish.

1.02 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.

1.03 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 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.
 - e. Special concrete finish 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. Methods for achieving specified floor and slab flatness and levelness.
 - k. Floor and slab flatness and levelness measurements.
 - l. Concrete repair procedures.
 - m. Concrete protection.
 - n. Initial curing and field curing of field test cylinders (ASTM C31/C31M.)
 - o. Protection of field cured field test cylinders.

1.04 ACTION SUBMITTALS

BLRB Architects
Portland, OR

CAST-IN-PLACE CONCRETE
03 30 00 - 1

- A. Product Data: For each of the following.
 - 1. Portland cement.
 - 2. Fly ash.
 - 3. Aggregates.
 - 4. Admixtures:
 - a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.
 - 5. Fiber reinforcement.
 - 6. Sub-slab membrane/vapor retarders.
 - 7. Liquid floor treatments.
 - 8. Curing materials.
 - 9. Joint fillers.
 - 10. Repair materials.
- B. Design Mixtures: For each concrete mixture, include the following:
 - 1. Mixture identification.
 - 2. Minimum 28-day compressive strength.
 - 3. Durability exposure class.
 - 4. Maximum w/cm.
 - 5. Calculated equilibrium unit weight.
 - 6. Slump limit.
 - 7. Air content.
 - 8. Nominal maximum aggregate size.
 - 9. Synthetic micro-fiber content.
 - 10. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.
 - 11. Intended placement method.
 - 12. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Shop Drawings:
 - 1. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 - a. Location of construction joints is subject to approval of the Architect.

1.05 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each of the following, signed by manufacturers:
 - 1. Cementitious materials.
 - 2. Admixtures.
 - 3. Fiber reinforcement.
 - 4. Curing compounds.
 - 5. Bonding agents.
 - 6. Adhesives.
 - 7. Sub-slab membrane/vapor retarders.
 - 8. Semirigid joint filler.
 - 9. Joint-filler strips.
 - 10. Repair materials.
- B. Floor surface flatness and levelness measurements report, indicating compliance with specified tolerances.

- C. Minutes of preinstallation conference.

1.06 QUALITY ASSURANCE

- A. 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.
- B. Field Quality Control Testing Agency Qualifications: An independent agency, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.
- C. Mockups: Cast concrete slab-on-grade and formed-surface panels to demonstrate typical joints, surface finish, texture, tolerances, floor treatments, and standard of workmanship.
 - 1. Slab-On-Grade: Build panel approximately 15 feet by 15 feet in the location indicated or, if not indicated, as directed by Architect.
 - a. Divide panel into four equal panels to demonstrate saw joint cutting.
 - 2. Slab-On-Grade to Receive Polished Finish: Build panel approximately 15 feet by 15 feet in the location indicated or, if not indicated, as directed by Architect.
 - a. Divide panel into four equal panels to demonstrate saw joint cutting.
 - 3. Formed Surfaces: Build panel approximately 100 sq. ft. in the location indicated or, if not indicated, as directed by Architect.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- D. Slab Moisture Content: Meet relative humidity (RH) maximum of 75% per ASTM F2170. Note that this RH threshold may be exceeded only if permitted and approved in writing by manufacturer of flooring adhesive used in Division 9 floor covering specifications. Verify and comply with RH requirements of all flooring covering types of Division 9.
 - 1. Conduct slab pre-installation meeting to review procedures to minimize slab moisture problems. Do so prior to slab installation.
 - 2. Assume full responsibility to ensure that concrete slabs are sufficiently dry to the criterion specified herein. Do so by managing the concrete floor slab installation within the minimum standards of these specifications and by augmenting these minimum standards with additional measures as needed. If needed to meet the 75% RH cap, such additional measures shall include, but are not limited to:
 - a. Minimizing slump and water/cement ratio to reduce initial moisture content of slabs.
 - b. Introducing super-plasticizers in slabs in lieu of water to minimize initial moisture content.
 - c. Protecting slab substrate from precipitation or other moisture sources prior to slab pour. (This measure has its acknowledged practical limitations, and there is no requirement to keep this substrate absolutely dry. Instead this is a recommendation to avoid pouring slabs on wet substrate when obvious adverse conditions exist— such as after a heavy downpour of rain, or with significant standing water or for other reasons—but defer to the contractor's judgment about means and methods and ultimately rely on the contractor's discretion as to the most cost-effective way to achieve the end result.)
 - d. Protecting slabs from water spills, clean-up water, rainwater, and other precipitation to avoid resaturation of slabs. (This measure has its acknowledged practical limitations, and there is no requirement to keep the slab absolutely dry. Instead this is a recommendation to minimize post-curing moisture to the greatest practical extent, but defer to the

- contractor's judgment about means and methods and ultimately rely on the contractor's discretion as to the most cost-effective way to achieve the end result.)
- e. Providing heat mats, dehumidifiers, and other mechanical means to ensure bake-out of slab moisture. Do not use unvented propane heaters which increase relative humidity.
 - f. Where feasible under carpeting, do not hard trowel the floor as smooth as would be required for resilient flooring. This recognizes that hard troweling tends to seal in moisture. But it also requires that the carpet substrate be sufficiently smooth so as not to telegraph any irregularities through to the carpet surface.
 - g. Other means acceptable within the bounds of this specification's minimum standards or other proposed alternative means not contemplated within these specifications provided that the Owner is notified of such other proposed alternative means and the Owner takes no exception to same.
- 3. Commence dry-out management efforts after initial wet cure procedures are complete, and after the risk of adverse effects from too hasty curing has expired.
 - 4. During the course of the project, regularly monitor slab moisture content and chart the moisture trends at least a monthly interval after initial slab cure. Report the findings of same to the Owner. If slab moisture content trends suggest excessive moisture that will jeopardize timely installation of floor covering, increase the monitoring interval to at least every two weeks and remediate the situation with mechanical means as needed (including heat mats, dehumidifiers, and other such means).

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Comply with ASTM C94/C94M and ACI 301.

1.08 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

2.01 CONCRETE, GENERAL

- A. ACI Publications: Comply with ACI 301 unless modified by requirements in the Contract Documents.

2.02 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 C150/C150M, Type I or II, gray.
 - 2. Fly Ash: ASTM C618, Class C or F.
- C. Normal-Weight Aggregates: ASTM C33/C33M, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source.
 - 1. Maximum Coarse-Aggregate Size: 1 inch nominal unless noted otherwise on the structural Drawings or schedule of concrete mixtures in this Section.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- 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.
 - 1. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
- F. Water and Water Used to Make Ice: ASTM C94/C94M, potable complying with ASTM C1602/C1602M, including all limits listed in Table 2 and the requirements of paragraph 5.4.

2.03 VAPOR RETARDERS

- A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A, except with maximum water-vapor permeance of 0.01; not less than 15 mils thick.
 - 1. Include manufacturer's recommended accessories, including but not limited to:
 - a. Adhesive or pressure-sensitive tape.
 - b. Mastic.
 - c. Perimeter or edge seal.
 - d. Double-sided adhesive strip or termination bar.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Fortifiber Building Systems Group.
 - b. Raven Industries, Inc.
 - c. Stego Industries, LLC.
 - d. W.R. Meadows, Inc.

2.04 LIQUID FLOOR TREATMENTS

- A. Concrete Sealer Hardener (SH) for Exposed Concrete Slabs to be Sealed:

1. Liquid Densifier and Sealer for Concrete: Clear, chemically reactive, waterborne solution of inorganic non-yellowing silicate or silicate materials and proprietary components; odorless; colorless; that penetrates, hardens, densifies, and seals concrete surfaces. The compound must contain a minimum solids content of 20% of which 50% is silicate.
 - a. Basis of Design Product: Euclid Chemical Company (The); Euco Diamond Hard, Liquid Densifier and Sealer for Concrete, or comparable product such as one of the following:
 - 1) Burke by Edoco; Titan Hard.
 - 2) ChemMasters; Chemisil Plus.
 - 3) Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior company; Intraseal.
 - 4) Curecrete Distribution Inc.; Ashford Formula.
 - 5) L&M Construction Chemicals, Inc.; Seal Hard.
 - 6) Meadows, W.R., Inc; Liqui-Hard.
 - 7) Nox-Crete Products Group, Kinsman Corporation; Duranox.

2.05 CURING MATERIALS

- A. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.
 1. Color:
 - a. Ambient Temperature Below 50 deg F: Black.
 - b. Ambient Temperature between 50 deg F and 85 deg F: Any color.
 - c. Ambient Temperature Above 85 deg F: White.
- B. Water: Potable or complying with ASTM C1602/C1602M.
- C. Clear, Waterborne, Membrane-Forming, Dissipating Curing Compound: ASTM C309, Type 1, Class B.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ChemMasters, Inc.
 - b. Dayton Superior.
 - c. Euclid Chemical Company (The); an RPM company.
 - d. Laticrete International, Inc.
 - e. W.R. Meadows, Inc.

2.06 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.
 2. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to Owner and as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in work
- 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 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 water-reducing admixture in pumped concrete, and concrete with a w/cm below 0.50.
 4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

2.07 CONCRETE MIXTURES

- A. Class C: Normal-weight concrete used for interior slabs-on-grade.
1. Exposure Class: ACI 318 F0.
 2. Minimum Compressive Strength: Comply with general notes on structural Drawings.
 3. Maximum w/cm: As required to meet the strength and durability requirements indicated.
 4. Slump Limit: Comply with general notes on structural Drawings.
 5. Air Content: Comply with general notes on structural Drawings.
 6. Limit water-soluble, chloride-ion content in hardened concrete to 0.10 percent by weight of cement.
 7. Synthetic Fiber: For all slabs-on-grade to receive ground and polished finish, uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than a rate of ≥ 0.5 lbs / cu yd. Fiber is in addition to, not in place of, any other reinforcing indicated on structural drawings.
- B. Class D: Normal-weight concrete used for interior elevated slabs on plywood subfloor to receive finish flooring.
1. Exposure Class: ACI 318 F0.
 2. Minimum Compressive Strength: Comply with general notes on structural Drawings.
 3. Maximum w/cm: As required to meet the strength and durability requirements indicated.
 4. Slump Limit: Comply with general notes on structural Drawings.
 5. Air Content: Comply with general notes on structural Drawings.
 6. Limit water-soluble, chloride-ion content in hardened concrete to 0.10 percent by weight of cement.
 7. Refer to Division 06 Section "Sheathing" for and sound mat to be installed under concrete over plywood underlayment.

2.08 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M, and furnish batch ticket information.

PART 3 - EXECUTION

3.01 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.

3.02 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.

3.03 CONCRETE PLACEMENT

- A. Before placing concrete verify that installation of formwork, reinforcement and embedded item installation 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 at least 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.

3.04 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 301 Surface 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 or to be covered with a coating or covering material applied directly to concrete.
 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.
 - e. Locations: Apply to concrete surfaces exposed to public view, to receive a rubbed finish.
- B. Rubbed Finish: Apply the following to as cast surface finishes where the finished condition will be exposed to view:
1. 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 mockups.
- C. Related Unformed Surfaces:
- 1. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a color and texture matching adjacent formed surfaces.
 - 2. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.05 FINISHING FLOORS AND SLABS

- A. Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish:
- 1. While still plastic, texture concrete surface that has been screeded and bull-floated or darbied.
 - 2. Use stiff brushes, brooms, or rakes to produce a profile depth of 1/4 inch in one direction.
 - 3. Apply scratch finish to surfaces to receive concrete floor toppings to receive mortar setting beds for bonded cementitious floor finishes.
- C. Float Finish:
- 1. When bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power- driven floats or by hand floating if area is small or inaccessible to power-driven floats.
 - 2. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture and complies with ACI 117 tolerances for conventional concrete.
 - 3. Apply float finish to surfaces to receive trowel finish and to be covered with fluid-applied or sheet waterproofing.
 - 4. For slabs to receive polished or burnished finish, allow concrete to set to a point where a 200 lbs load over a 0.5 square foot area (roughly equivalent to a footprint) leaves a 1/8 inch depression, before proceeding with troweling.
- D. Trowel Finish:
- 1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
 - 2. Continue troweling passes and restraighen until surface is free of trowel marks and uniform in texture and appearance.
 - 3. 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. For slabs to receive polished or burnished finish, power trowel with pans until machine is working hard, and switch to finish blades on the final pass, to ensure fibers are buried in the cement paste.
 8. Finish surfaces to the following tolerances, in accordance with ASTM E1155, for a randomly trafficked floor surface:
 - a. Slabs on Grade:
 - b. 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 1/8 inch.
 - 1) Typical Slabs to Receive Finish Flooring: Specified overall values of flatness, FF 35; and of levelness, FL 25; with minimum local values of flatness, FF 24; and of levelness, FL 17.
 - 2) Slabs to Receive Polished or Burnished Finish: Specified Overall Value (SOV): FF 50 and FL 30 with minimum local value (MLV): FF 35 and FL 20.
 - 3) Slabs to Receive Wood Athletic Flooring: Meet requirements of gym flooring manufacturer, and not less than the following:
 - (a) Specified Overall Value (SOV): FF 25 and FL 20 with minimum local value (MLV): FF 17 and FL 15.
 - c. Elevated Slabs:
 - 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 1/8 inch.
 - 2) Typical Slabs to Receive Finish Flooring: Specified overall values of flatness, FF 30; and of levelness, FL 25; with minimum local values of flatness, FF 24; and of levelness, FL 17.
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thinset method. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.
1. Coordinate required final finish with Architect before application.
 2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
- F. 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.

3.06 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: 4000 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.
- D. Nosings, Inserts, and Other Accessories: Cast-in inserts and accessories as shown on Drawings.
 - 1. Stair Nosings:
 - a. Install inserts on nosing on each stair tread, each mid-level landing, and each top landing.
 - b. Install nosing base and disposable wood inserts in precast units prior to casting.
 - c. Following casting, mask all surfaces that will be exposed to view in finished construction during finishing operations. After finishing, remove masking.
 - d. Install finished insert with anti-slip treatment after treads and landings are completed. Gaps between ends of inserts and faces of stringers shall be equal to the distance from the face of stringer to the eased edge on the end of each unit, not exceeding 1/8 inch.
 - e. At stairs and other horizontal surfaces to receive polished finish, coordinate exact depth in pour for nosings and inserts so that inserted items align flush with finished surfaces after polishing.

3.07 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 Sheetting Materials: Cover exposed concrete surfaces with sheetting 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 or Burnished 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.
- d. Floors to Receive Curing Compound:
 - 1) Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
 - 3) Maintain continuity of coating, and repair damage during curing period.
 - 4) Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.

3.08 TOLERANCES

- A. Conform to ACI 117.

3.09 APPLICATION OF LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment (Sealer): Apply to slabs indicated to receive sealer in Drawings.
 - 1. Prepare, apply, and finish penetrating liquid floor treatment in accordance with manufacturer's written instructions.
 - a. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
 - b. Do not apply to concrete that is less than seven days' old.
 - c. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing.
 - d. Rinse with water; remove excess material until surface is dry.
 - e. Apply a second coat in a similar manner if surface is rough or porous.

3.10 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(s).
 - 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.

3.11 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.

3.12 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: 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. 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.
 4. 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.
 5. 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.
 6. Compression Test Specimens: ASTM C31/C31M:
 - a. Cast and laboratory cure two sets of two 6-inch by 12-inch or three 4-inch by 8-inch cylinder specimens for each composite sample.
 - b. Cast, initial cure, and field cure two sets of two three standard cylinder specimens for each composite sample.
 7. Compressive-Strength Tests: ASTM C39/C39M.
 - a. Test one set of two three laboratory-cured specimens at seven days and one set of two specimens at 28 days.
 - b. Test one set of two 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.
 8. 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.
 9. 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.
 10. 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.
 11. 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.
 12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
 13. 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.

3.13 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 or burnished concrete finish using Floor Slab Protective Covering.

3.14 KEYNOTE SCHEDULE

- A. Products in this Specification Section are cited in the Drawings as KEYNOTES. See PART 2 - PRODUCTS for information on the following keynotes:

1.	KEYNOTE	DESCRIPTION
a.	033000.SH	SEALER - HARDENER
b.	033000.VR	VAPOR RETARDER

END OF SECTION 03 30 00

This page intentionally left blank

SECTION 03 36 00 - GROUND AND POLISHED CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Sealing concrete surfaces.
- B. Related Sections:
 - 1. Division 03 Section "Cast-In-Place Concrete" for general applications of concrete and coordination of sample submittal and color selection, as well as special requirements for ground and polished concrete slabs, including flatness tolerances, mixtures, placement, curing, finishing and joints.
 - 2. Division 07 Section "Joint Sealants" for colored sealant for joints.

1.02 REFERENCES

- A. American Concrete Institute (ACI):
 - 1. ACI 301 "Specification for Structural Concrete for Buildings."
 - 2. ACI 302 IR "Recommended Practice for Concrete Floor and Slab Construction."
 - 3. ACI 303.1 "Standard Specification for Cast-In-Place Architectural Concrete."
 - 4. ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing of Concrete."
 - 5. ACI 305R "Recommended Practice for Hot Weather Concreting."
 - 6. ACI 306R "Recommended Practice for Cold Weather Concreting."
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM C 309 "Liquid Membrane-Forming Compounds for Curing Concrete."
 - 2. ASTM C 494 "Standard Specification for Chemical Admixtures for Concrete."
 - 3. ASTM C 779 "Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces."
 - 4. ASTM E 430 "Standard Test Method for Measurement of Gloss of High-Gloss Surfaces by Abridged Goniophotometry."
 - 5. ASTM E 1155 "Standard Test Method for Determining Floor Flatness and of Levelness Using the F Number System."

1.03 DEFINITIONS

- A. Cut and Shine Levels:
 - 1. Aggregate Exposure Class:
 - a. Class A - cream finish.
 - b. Class B - sand salt and pepper.
 - c. Class C - medium aggregate.
 - d. Class D - large aggregate.
 - 2. Gloss Level:
 - a. Level 1 - low gloss.
 - b. Level 2 - medium gloss.
 - c. Level 3 - high gloss.
 - d. Level 4 - very high gloss.

1.04 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with polished 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. Cast-in-place concrete subcontractor.
 - e. Polished concrete finishing Subcontractor.
 - 2. Review cold- and hot-weather concreting procedures, curing procedures, construction joints, concrete repair procedures, concrete finishing, and protection of polished concrete.

1.05 SUBMITTALS

- A. Product Data: Submit manufacturer's complete technical data sheets for the following:
 - 1. Curing compound.
 - 2. Densifier.
 - 3. Penetrating sealer.
 - 4. Pigment.
 - 5. Guards.
 - 6. Grinding machine, including all types of grinding heads, dust extraction system, joint filler, and any other chemicals used in the process.
- B. Samples for Verification: For each type of exposed finish.
- C. Qualification Data: For firms indicated in "Quality Assurance" Article.
 - 1. Manufacturer's Certification: Provide a letter of acknowledgement from both the equipment and chemical manufacturer stating that the installer is a trained applicator and is familiar with proper procedures and installation requirements recommended by the manufacturer.
 - 2. Installer's Experience: Provide project names, addresses, contact names, phone numbers of at least three (3) projects of similar scope completed by the installer.
 - 3. Installer's Certification: Provide certification from finish equipment manufacturer and L.M. Scofield Company (manufacturer of densifier and guard).
- D. Material Certificates: For each of the following, signed by manufacturers:
 - 1. Repair materials.
 - 2. Liquid floor treatments.
- E. Polishing Schedule: Submit plan showing polished concrete surfaces and schedule of polishing operations for each area of polished concrete before start of polishing operations. Include locations of all joints, including construction joints.

1.06 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Polished concrete slip resistance testing agency shall 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.

- B. Manufacturer Qualifications: Manufacturer with experience in the production of specified products.
- C. Installer Qualifications: An installer with 5-years experience with work of similar scope and quality.
 - 1. Installer/Applicator shall be certified by concrete finish equipment and chemical manufacturer and shall provide adequate number of skilled workmen who are thoroughly trained and experienced in the necessary craft.
- D. Comply with the requirements of ACI 301.
- E. Notify manufacturer's authorized representative at least one (1) week before start of Work.
- F. Field Sample Panels: After approval of verification sample and before casting concrete, produce field sample panels to demonstrate the approved range of selections made under Sample submittals. Produce a minimum of three sets of full-scale panels, approximately 48 by 48 inches minimum, to demonstrate the expected range of finish, color, and appearance variations.
 - 1. Locate panels as indicated or, if not indicated, as directed by Architect.
 - 2. Maintain field sample panels during construction in an undisturbed condition as a standard for judging the completed Work.
 - 3. Demolish and remove field sample panels when directed.
- G. Mockups: Before casting concrete, build mockups to verify selections made under Sample submittals and to demonstrate typical joints, surface finish, tolerances, and standard of workmanship. Build mockups to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockup in the audio visual room or chair storage room as directed by Architect. Include edges in mockup. Mockup shall be produced by the individual workers who will perform the Work for the Project.
 - 2. Test selected aggregate to ensure it will accept polish.
 - 3. Demonstrate curing, finishing, and protecting of polished concrete.
 - 4. Perform slip resistance testing on mockup in accordance with ANSI B101.3 DCOF Test to determine slip resistant coefficient of installed polished concrete.
 - 5. Retain samples of cements, sands, aggregates and color additives used in mockup for comparison with materials used in remaining work.
 - 6. Mockup shall remain through completion of Work for use as a quality standard for finished work.
 - 7. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- H. Protect surface before and after processing or polishing installation, including but not limited to the following:
 - 1. Diaper all equipment.
 - 2. Vehicles are not permitted on surface.
 - 3. Do not allow acids to contact surface.
 - 4. Do not place any material onto surface that may cause staining, etching or scratching.
 - 5. Remind all trades they are working on a surface that is to become a finished surface.

1.07 PROJECT CONDITIONS

- A. Environmental Requirements:

1. Comply with manufacturer's written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation and other conditions affecting chemical performance.
 2. Schedule placement to minimize exposure to wind and hot sun before curing material is applied.
 3. Avoid placing concrete if rain, snow, or frost is forecast within 24-hours. Protect fresh concrete from moisture and freezing.
 4. Comply with professional practices described in ACI 305R and ACI 306R.
- B. Schedule delivery of concrete to provide consistent mix times from batching until discharge. Mix times shall meet manufacturer's written recommendations.
- C. Curing: Cure finish concrete a minimum of 28 days, or for length of time required to avoid displacement of aggregate under weight of equipment placed on slab.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURER

- A. Basis of Design Manufacturers: Subject to compliance with requirements, provide products specified below manufactured by L.M. Scofield Company, or comparable products by Solomon Colors, Inc.
- B. Source Limitations: Obtain each component required for ground and polished concrete from single source from single manufacturer to ensure compatibility of materials with each other.

2.02 MATERIALS

- A. General: Materials include separate products which are formulated to work together:
1. Lithium-based densifier to improve concrete strength and minimize dusting.
 2. Finishing guard product to protect against staining and enhance the shine, where indicated.
- B. Acceptable Products, Unless Otherwise Noted:
1. Basis of Design Products:
 - a. Densifier: L.M. Scofield Company; Formula One™ Lithium Densifier MP.
 - b. Guard: L.M. Scofield Company; Guard-W Concentrate.
- C. Curing Compounds:
1. Basis of Design Product for Polished Concrete: L.M. Scofield Company; Lithochrome® Colorwax™. Use to cure all flatwork that will be polished.
- D. Equipment:
1. 3-head or 4-head counter rotating variable speed floor grinding machine with at least 600 pounds down pressure.
 2. Dust extraction system, pre-separator, and squeegee attachments with minimum flow rating of 322 cubic feet per minute.
 3. Grinding heads:
 - a. Metal bonded 16, 25, 40, 60, 80, 150 and 300 grits.
 - b. Resin bonded, phenolic diamonds, 100, 200, and 400.
 4. Grinding pads for edges:
 - a. 40, 60, 100 and 120 grits.
 - b. 200, and 400.
 5. Hand grinder with dust extraction equipment and pads.

- E. Substitutions: The use of products other than those specified will be considered providing that the Contractor requests their use in writing within the time allowed during the bidding period (refer to Division 00 and 01 requirements). Submit the following with formal request:
1. A certificate of compliance from material manufacturer stating that proposed products meet or exceed requirements of this Section, including standards ACI 303.1, ASTM C 979, ASTM C 494 and AASHTO M194.
 2. Documented proof that proposed materials have a 10-year proven record of performance, confirmed by at least 5 local projects that the Architect can examine.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verification: Confirm slab requirements as specified here and in Division 03 Section "Cast-in-Place Concrete" through the use of a third party testing company.
1. Cure concrete a minimum of 28 days to achieve a minimum compressive strength of 3,500 to 5,000 psi.
 2. Confirm minimum floor flatness rating of 50.
 3. Confirm minimum floor levelness rating of 30.
 4. Power troweled, not burned and no hand finishing.
 5. If fine aggregate finish with minimum aggregate has been specified, confirm concrete was vibrated and was thoroughly floated and tamped.
- B. Immediately notify Architect of unsatisfactory conditions. Do not proceed until surface is in compliance with specified and installer's recommendations, or unless otherwise in writing agreed upon between Installer and Architect.
- C. Identify and rectify any conditions and/or concerns that will affect final finish. Do not begin installation until substrates have been properly prepared unless otherwise in writing agreed upon between Installer and Architect.

3.02 POLISHED CONCRETE APPLICATION

- A. Apply finish system a minimum of 21 days prior to fixture and trim installation and/or Substantial Completion.
- B. Finish Requirements: Provide the following finish grade and class per the Concrete Polishing Council:
1. Provide Class B aggregate exposure - sand salt and pepper.
 2. Provide Level 2 gloss level - 800 grit - medium gloss shine level finish.
- C. Applicator shall examine the areas and conditions under which work of this Section will be provided and the Contractor shall correct conditions detrimental to the timely and proper completion of the work and the Applicator shall not proceed until unsatisfactory conditions are resolved.
- D. Grind the concrete floor to within 2 - 3 inches of walls with 16, 25, 40, 60, 80 and/or 150 grit removing construction debris, floor slab imperfections and until there is a uniform scratch pattern and desired concrete aggregate exposure.
- E. Apply material approved by Architect for color effects in accordance with the architectural Drawings and the manufacturer's recommended guidelines.

- F. Fill construction joints and cracks with filler products as specified in accordance with manufacturer's instructions colored to match (or contrast) with concrete color as specified by Architect.
- G. Dilute densifier 1:1 with fresh water then apply using a pump sprayer at a rate of 200 - 400 square feet per gallon. Use a stiff, long bristled broom work the material in to the slab. If any material collects in low spots, use the broom to push it out and spread it around. Cover the entire area liberally and keep wet with densifier for 20 to 30 minutes. During this time-frame, retreat any areas that dry out. After 30 minutes, rinse and squeegee excess material off the floor. An autoscrubber works well for this application. Allow 12 to 24 hours for full cure.
- H. Grind the floor to within 2 - 3 inches of walls with metal bonded diamond grits of 150 and 300-grinding 90 degrees from each previous grind and removing all the scratches from the previous grit. Vacuum the floor thoroughly after each grind using a squeegee vacuum attachment.
- I. Grind the edges with 40, 60, 120 and 220 grit grinding pads removing all of the scratches from the previous grit. Vacuum the floor thoroughly after each grind using a squeegee vacuum attachment.
- J. Polish the floor, to desired sheen level, with phenolic resin bonded diamond grits of 100, 200, 400, and 800 - first polishing the edges (if specified) with pads of the same grit and then the field of the floor removing all scratches from the previous grit. After each polish, clean the floor thoroughly using clean water and an auto scrubber or a mop and a wet vacuum.
- K. Apply diluted densifier at a rate of 400 square feet per gallon. Using a broom, work the material into the floor for a minimum of 10 minutes. Tight squeegee the remaining material from the floor without leaving squeegee marks or puddles. Allow to cure for 12 - 24 hours.
- L. Polish with 800-resin bond diamonds to final shine level classification.
- M. Apply guard product at 1500 to 2000 square feet per gallon using a pump sprayer and a low-nap micro-fiber cloth to "stretch" the material as far as possible.
- N. Using a high speed (1500 to 2000 rpm) burnishing machine and a hogs hair or 3000 grit diamond impregnated burnishing pad, buff the surface to a high shine in two passes running 90 degrees from one another.

3.03 PROTECTION

- A. Use temporary floor protection throughout the course of the Project to safeguard the surface quality of concrete slabs before and after application of decorative finishes or installations of other materials. The concrete slab must be treated as a finished floor at all times during construction.
- B. Temporary Floor Protection will be removed only while finish work to the concrete is being performed and will be replaced after the final finish has cured sufficiently.
- C. Temporary Floor Protection:
 - 1. Basis of Design Product: Proguard Duracover as manufactured by L. M. Scofield Company. Seaming of the temporary floor protection will be performed with Scofield Proguard Heavy Duty Seaming Tape. Install both products following the manufacturer's written installation procedures.

2. Temporary floor protection is required between curing and polishing work to protect the floor from damage, and again after the polish work to protect the finished floor from additional damage during the finishing operations.
- D. Do not apply heavy duty seaming tape to bare or finished floors or wall surfaces at any time.

3.04 CLEANING

- A. The work area shall be kept clean and free of debris at all times.
- B. Remove slurry and dust from adjoining surfaces as necessary.
- C. Dispose of material containers in accordance with local regulations.
- D. Protect finished work until fully cured per manufacturer's recommendations.

3.05 KEYNOTE SCHEDULE

- A. Products in this Specification Section are cited in the Drawings as KEYNOTES. See PART 2 - PRODUCTS for information on the following keynotes:
 1.

<u>KEYNOTES</u>	<u>DESCRIPTION</u>
a. 033600.PC	POLISHED CONCRETE

END OF SECTION 03 36 00

This page intentionally left blank

SECTION 06 20 23 - INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes the following:
 - 1. Window casing.
 - 2. Wood furring, blocking, shims, and hanging strips for installing architectural cabinets unless concealed within other construction before cabinet installation.
 - 3. Shop finishing of interior woodwork.
- B. Related Sections include the following:
 - 1. Division 09 Section "Interior Painting."
 - 2. Division 09 Section "Staining and Transparent Finishing."

1.02 DEFINITIONS

- A. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. CCP: Certified Compliance Program.
 - 2. NAAWS: North American Architectural Woodwork Standards.
 - 3. NeLMA: Northeastern Lumber Manufacturers' Association.
 - 4. NHLA: National Hardwood Lumber Association.
 - 5. NLGA: National Lumber Grades Authority.
 - 6. SPIB: The Southern Pine Inspection Bureau.
 - 7. WCLIB: West Coast Lumber Inspection Bureau.
 - 8. WI: Woodwork Institute www.woodworkinstitute.com; 916-372-9943.
 - 9. WWP: Western Wood Products Association.
- B. Paneling: Paneling includes wood furring, blocking, and shims for installing paneling, unless concealed within other construction before paneling installation.

1.03 SUBMITTALS

- A. General: Submit in conformance with NAAWS (latest edition) Section 1 "Submittals."
- B. 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 fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
 - 2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
 - 3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.
- C. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
 - 1. For certified shops; apply WI-Certified Compliance Label to first page of shop drawings.

2. Show on a minimum of 11 by 17 inch sheet, reference plan location of each item in minimum 1/4 inch = 1 foot scale, dimensioned plans and elevations in minimum 3/8 inch = 1 foot scale, detailed section views in minimum 1-1/2 inch = 1 foot scale, large-scale details, attachment devices, and other components as needed to clearly indicate what is provided, its method(s) of construction and attachment, and include:
 - a. A cover or title sheet.
 - b. A table of contents.
 - c. An itemized material list.
 3. Show details full size of all trim profiles
 4. Show centerline locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
- D. Shop Drawings for Plywood Paneling: Show location of paneling, large-scale details, attachment devices, and other components. Include dimensioned plans and elevations.
1. For certified shops; apply WI-Certified Compliance Label to first page of shop drawings.
 2. Show location of paneling, large-scale details, attachment devices, and other components. Include dimensioned plans and elevations.
 3. Show details full size.
 4. Show centerline locations and sizes of furring and blocking, including concealed blocking specified in other Sections.
 5. For paneling produced from pre-manufactured sets, show finished panel sizes, set numbers, sequence numbers within sets, and method of cutting panels to produce indicated sizes.
- E. Samples for Initial Selection:
1. Two sets of samples of each trim profile used.
 2. Plastic laminates, for each color, pattern, and surface finish.
 3. Sample of window stool with shop-applied stain and transparent finishes, 8 inches long to match related wood samples.
 - a. Coordinate with Division 09 Section "Staining and Transparent Finishing" and Finish Schedule for finishes to match Architects sample.
- F. Samples for Verification:
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. Lumber for transparent finish, not less than 6 inches long, for each species and cut, finished on 1 side and 1 edge.
 3. Lumber for shop-applied opaque finish, 50 sq. in. for lumber and 8 by 10 inches for panels, for each finish system and color, with 1/2 of exposed surface finished.
 4. Plywood paneling with designated finish applied, 8 x 10 inches.
 5. Exposed Cabinet Hardware and Accessories: One full-size unit for each type and finish.
- G. Product Certificates: For each type of product, signed by product manufacturer.
- H. Qualification Data: For Installer.

1.04 QUALITY ASSURANCE

- A. Quality Standard: Unless otherwise indicated, comply with NAAWS for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.

- B. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance. Shop is a certified participant in AWI's Quality Certification Program; or certified participant in WI's Certified Compliance Program (AMC - Accredited Millwork Companies); or a non-certified shop that is able to fabricate to WI's Certified Compliance Program requirements per the NAAWS.
- C. Installer Qualifications: Certified participant in AWI's Quality Certification Program; or a certified participant of WI's Certified Compliance Program; or a non-certified installer that is able to install to WI's Certified Compliance Program requirements per the NAAWS.
- D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Provide complete window casing mock-up for review.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
 - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect materials against weather and contact with damp or wet surfaces. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation. Provide for air circulation within and around stacks and under temporary coverings.
- B. Deliver interior finish carpentry materials only when environmental conditions meet requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions meet requirements specified for installation areas.
- C. Do not deliver paneling until painting and similar operations that could damage paneling have been completed in installation areas. If paneling must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.06 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Do not install 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.
- C. Field Measurements: Where woodwork and paneling is indicated to fit to other construction, verify dimensions of other construction by field measurements before

fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support woodwork and paneling by field measurements before being enclosed, and indicate measurements on Shop Drawings.
2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork and paneling without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.07 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.01 WOODWORK FABRICATORS

- A. Available Fabricators: Subject to compliance with requirements, fabricators offering interior architectural woodwork that may be incorporated into the Work include the following:
 1. Qualified firms, including but not limited to the following shops, that are certified participants in AWI's Quality Certification Program or WI's Certified Compliance Program, or a non-certified shop that can fabricate to WI's Certified Compliance Program requirements per the NAAWS:
 - a. Advanced Custom Cabinets (Coeur d'Alene, ID).
 - b. Cascade Casework (Lebanon, OR).
 - c. Frontier Door & Cabinet LLC (Tacoma, WA).
 - d. Genothén (Tumwater, WA).

2.02 MATERIALS, GENERAL

- A. General: Provide materials that comply with requirements of NAAWS quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.
- B. Wood Species and Cut for stain and transparent finish: Maple, FAS Premium grade.
- C. Wood Products: Comply with the following:
 1. Hardboard: AHA A135.4.
 2. Softwood Plywood: DOC PS 1, Medium Density Overlay.
 3. Lumber: DOC PS 20 and applicable grading rules of inspection agencies certified by ALSC's Board of Review.
 - a. Factory mark each piece of lumber with grade stamp of inspection agency indicating grade, species, moisture content at time of surfacing, and mill.
 - b. For exposed lumber, mark grade stamp on end or back of each piece.
 4. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1, made with adhesive containing no urea formaldehyde.
- D. Hardwood Plywood: HPVA HP-1 Grade A; veneer core, type of glue recommended for application; of grain quality suitable for transparent finish.

- E. Softwood Plywood: ACX or BCX.
- F. Marine Grade Plywood (Low Void) Moisture Resistant.
 - 1. MR Grade Applyply or EQ.

2.03 FIRE-RETARDANT-TREATED MATERIALS

- 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.
 - 1. Do not use treated materials that do not comply with requirements of referenced woodworking standard or that are warped, discolored, or otherwise defective.
 - 2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
 - 3. Identify fire-retardant-treated materials with appropriate classification marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Comply with performance requirements of AWPA C20 (lumber) and AWPA C27 (plywood). Use the following treatment type:
 - 1. Interior Type A: Low-hygroscopic formulation.
 - 2. Mill lumber after treatment within limits set for wood removal that do not affect listed fire-test-response characteristics, using a woodworking plant certified by testing and inspecting agency.
 - 3. Mill lumber before treatment and implement special procedures during treatment and drying processes that prevent lumber from warping and developing discolorations from drying sticks or other causes, marring, and other defects affecting appearance of treated woodwork.
 - 4. Kiln-dry materials before and after treatment to levels required for untreated materials.

2.04 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.
- B. 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.
 - 1. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Where galvanized finish is indicated, provide fasteners and anchorages with hot-dip galvanized coating complying with ASTM A 153/A 153M.
 - 2. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.
- C. Adhesives, General: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.
 - 1. Do not use adhesives that contain urea formaldehyde.
 - 2. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement or Resorcinol.
 - 3. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

4. Multipurpose Construction Adhesive: Formulation complying with ASTM D 3498 that is recommended for indicated use by adhesive manufacturer.
5. VOC Limits for Installation Adhesives and Glues: Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a. Wood Glues: Use wood glue that has a VOC content of 30 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - b. Multipurpose Construction Adhesive: Use adhesive that has a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - c. Contact Adhesive: Use contact adhesive that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.05 FABRICATION, GENERAL

- A. Interior Woodwork Grade: Unless otherwise indicated, provide Premium-grade interior woodwork complying with referenced quality standard.
- B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.
- C. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.
- D. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
 1. Edges of Solid-Wood (Lumber) Members: 1/16 inch unless otherwise indicated.
 2. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members 3/4 Inch Thick or Less: 1/16 inch.
 3. Edges of Rails and Similar Members More Than 3/4 Inch Thick: 1/8 inch.
 4. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members and Rails: 1/16 inch.
- E. Complete fabrication, including assembly, finishing, and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
 1. Notify Architect seven days in advance of the dates and times woodwork fabrication will be complete.
 2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.
- F. Shop-cut openings to maximum extent possible to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
 1. Seal edges of openings in countertops with a coat of varnish.

2.06 WINDOW CASINGS (WC)

- A. Apple plywood: Marine Grade Plywood (Low void).

1. Dimensions: As indicated in Drawings
2. Finish: Stain and finish to match Architect's sample as indicated in Finish Schedule on Drawings.

2.07 PLASTIC LAMINATE PANELING (PLP)

- A. Grade: Premium
- B. Plastic Laminate: High-pressure decorative laminate complying with NEMA LD 3 and the following requirements.
 1. Faces: Grade HGS.
 2. Backs: Grade BKH.
 3. Exposed Edges: Same as faces.
- C. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed surfaces complying with the following requirements.
 1. Wilsonart brand, high pressure laminate, color as indicated in Finish Schedule on the Drawings.
 - a. Color: As noted on Drawings in Finish Schedule.
 2. Grain Direction: Vertical, unless noted otherwise.
- D. Panel Core: medium density fiberboard.
 1. Thickness: 1/2 inch.
- E. Exposed Panel Edges: Plastic laminate matching faces with edge banding.
 1. Edge banding to match color of laminate.
- F. Panel Reveals: Provide flat black paint color for wall at back of reveal or as otherwise indicated on Drawings.
- G. Adhesives for Bonding Plastic Laminate: Non-Urea formaldehyde adhesive recommended by laminate manufacturer.
 1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.08 SHOP FINISHING

- A. General: Finish architectural woodwork at fabrication shop to the greatest extent possible.
 1. See Division 09 Section "Staining and Transparent Finishing" for more information.
- B. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.
 1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling and to end-grain surfaces. Concealed surfaces of plastic-laminate-clad woodwork do not require backpriming when surfaced with plastic laminate, backing paper, or thermoset decorative panels.
- C. Transparent Finish:
 1. NAAWS Finish System 12: Polyurethane, Water-based.
 2. Back-Seal: Seal back of finished paneling prior to installation of metal edge trim to prevent moisture absorption. Not necessary to back seal plywood wainscoting.

3. Edge-Seal: Seal edges of finished paneling prior to installation of metal edge trim to prevent moisture absorption.
4. Wash Coat for Stained Finish: Apply wash-coat sealer to woodwork made from closed-grain wood before staining and finishing.
5. Staining: Match Architect's sample.
6. Sheen: Satin, 31-45.
7. Sheen: As selected by the Architect at time of stain sampling and draw-downs from both satin and semi-gloss sheens.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- 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.

3.02 PREPARATION

- A. 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.
- B. Before installing interior finish carpentry, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.
- C. Coordinate prior to erection of wall sheathing materials the location of all wood paneling edge framing, blocking and strapping members to allow fasteners of adjacent paneling members to be placed allowing panel edge setback of fasteners for all paneling. Provide sufficient surface area of edge framing, blocking and strapping allowing equal set back of fasteners from panel edges on adjacent panels.
- D. Clean substrates of projections and substances detrimental to application.

3.03 INSTALLATION, GENERAL

- A. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.
- B. Assemble woodwork and complete fabrication at Project site to comply with requirements for fabrication in Part 2, to extent that it was not completed in the shop.
- C. 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.
- D. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
 1. Scribe and cut interior finish carpentry to fit adjoining work. Refinish cut surfaces, and repair damaged finish at cuts.

2. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.
3. 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.
4. 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.

3.04 ADJUSTING AND CLEANING

- A. Replace interior finish carpentry that is damaged or does not comply with requirements. Interior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.
- B. Clean woodwork on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

3.05 PROTECTION

- A. Protect installed products from damage from weather and other causes during remainder of the construction period.
- 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.

3.06 KEYNOTE SCHEDULE

- A. Products in this Specification Section are cited in the Drawings as KEYNOTES. See PART 2 - PRODUCTS for information on the following keynotes:
 1.

<u>KEYNOTE</u>	<u>DESCRIPTION</u>
a.	062023.WC WINDOW CASINGS

END OF SECTION 06 20 23

This page intentionally left blank

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Standard hollow metal frames.
 - 2. Factory finishing hollow metal frames and factory machining for hardware.
- B. Related Sections:
 - 1. Division 08 Sections "Flush Wood Doors" for wood doors in hollow metal frames.
 - 2. Division 09 Sections "Interior Painting" for field painting hollow metal frames.
 - 3. Division 26 Sections for electrical connections including conduit and wiring for door controls and operators.

1.02 REFERENCES

- A. ANSI (American National Standards Institute):
 - 1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
 - 2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
 - 3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
 - 4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
 - 5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
 - 6. ANSI/SDI A250.13 - Testing and Rating of Sever Windstorm Resistant Components for Swing Door Assemblies.
 - 7. ANSI/NAMM/HMMA 867-06 - Guide Specifications for Commercial Laminated Core Hollow Metal Doors and Frames.
 - 8. ANSI/BHMA A156.15 - Hardware Preparation in Steel Doors and Frames.
 - 9. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
 - 10. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
 - 11. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
- B. ASTM (American Society for Testing and Materials):
 - 1. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
 - 2. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 3. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
 - 4. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
 - 5. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

6. ASTM E283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Doors Under Specified Pressure Differences Across the Specimens.
 7. ASTM E 413 - Classification for Rating Sound Insulation.
 8. ASTM E1332 - Standard Classification for Determination of Outdoor-Indoor Transmission Class.
- C. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
- D. UL 10C (1998) - Positive Pressure Fire Tests of Door Assemblies; UL 1784 (2001) - Standard for Air Leakage Tests of Door Assemblies.

1.03 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings.
- B. Custom Hollow Metal Work: Hollow metal work fabricated according to ANSI/NAAMM-HMMA 861.

1.04 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating,, temperature-rise ratings, and finishes.
- B. Shop Drawings: Include the following:
1. Elevations of each door design.
 2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 4. Detail Door and Frame anchorage to Aluminum storefront framing.
 5. Locations of reinforcement and preparations for hardware.
 6. Details of each different wall opening condition.
 7. Details of anchorages, joints, field splices, and connections.
 8. Details of accessories.
 9. Details of moldings, removable stops, and glazing.
 10. Details of conduit and preparations for power, signal, and control systems.
- C. Other Action Submittals:
1. Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.
- D. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.
- E. Product Test Reports: For each type of fire-rated hollow-metal door and frame assembly and thermally rated door assemblies for tests performed by a qualified testing agency indicating compliance with performance requirements.

1.05 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.

- B. Quality Standard: In addition to requirements specified, comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".
 - C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 (neutral pressure at 40" above sill) or UL 10C.
 - 1. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, 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.
 - 2. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784.
 - a. Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.
 - D. Energy Efficient Exterior Openings: Comply with minimum thermal ratings, based on ASTM C1363. Openings to be fabricated and tested as fully operable, thermal insulating door and frame assemblies.
 - 1. Thermal Performance (Exterior Openings): Independent testing laboratory certification for exterior door assemblies being tested in accordance with ASTM C1363 and meet or exceed the following requirements:
 - a. Door Assembly Operable U-Factor and R-Value Ratings: U-Factor 0.35, R-Value 2.9, including insulated door, thermal-break frame and threshold.
 - 2. Air Infiltration (Exterior Openings): Independent testing laboratory certification for exterior door assemblies being tested in accordance with ASTM E283 to meet or exceed the following requirements:
 - a. Rate of leakage of the door assembly shall not exceed 0.30 cfm per square foot of static differential air pressure of 1.567 psf (equivalent to 25 mph wind velocity).
 - E. Sound Transmission Class (STC) Rated Doors: Provide sound transmission class rated doors fabricated as sound-reducing types with testing according to ASTM E 90, and classifications according to ASTM E 413. Submit manufacturer's written results of STC ratings from testing performed by a qualified independent testing agency for sound resistant doors.
 - F. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.
- 1.06 DELIVERY, STORAGE, AND HANDLING
- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.
 - 1. Provide additional protection to prevent damage to finish of 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 work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch-high wood blocking. Do not store in a manner that traps excess humidity.
 - 1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.07 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.08 COORDINATION

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
 - 1. Coordinate and provide anchorage to Aluminum Storefront framing.

1.09 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
- B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Apex Industries, Inc.
 - 2. Ceco Door; AADG, Inc.; ASSA ABLOY.
 - 3. Curries, AADG, Inc.; ASSA ABLOY Group.
 - 4. Republic Doors and Frames; a Allegion brand.
 - 5. Steelcraft; Allegion plc.
 - 6. Stiles Custom Metal, Inc.

2.02 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 or A60 metallic coating.
- D. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Zcoating designation; mill phosphatized.
 - 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

- F. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.
- G. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M. Cement grout for all steel frames (door and relite) in concrete and masonry walls (see Division 04 Section "Unit Masonry"). Do not grout mullions or frames that are fully enclosed.
- H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
 - 1. Provide insulated door assembly with a minimum of .36 U.
- I. Glazing: Comply with requirements in Division 08 Section "Glazing."
- J. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities. Do not apply to fire-rated frames.
- K. Dissimilar Metals: provide isolation protection of dissimilar metals.

2.03 STANDARD HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Exterior Masonry Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.
 - 1. Fabricate frames with mitered or coped corners.
 - 2. Fabricate frames, with the exception of knock down types, with "closed and tight" miter seams continuously welded on face, finished smooth with no visible seam unless otherwise indicated.
 - 3. Frames for Level 3 Steel Doors (up to 48 inches in width): Minimum 0.067-inch thick steel sheet.
 - 4. Basis of Design:
 - a. CECO Door Products (C) - SQ/SU and SR Series.
- C. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.
 - 1. Fabricate frames with mitered or coped corners.
 - 2. Fabricate frames, with the exception of slip-on drywall types, with "closed and tight" miter seams continuously welded on face, finished smooth with no visible seam unless otherwise indicated.
 - 3. Frames for Level 2 Steel Doors: Minimum 0.053-inch thick steel sheet.
 - 4. Frames for Wood Doors: Minimum 0.053-inch thick steel sheet.
 - 5. Frames for Borrowed Lites: Minimum 0.053-inch thick steel sheet.
 - 6. Basis of Design:
 - a. Masonry: CECO Door Products (C) - SQ/SU and SR Series.
 - b. Drywall: CECO Door Products (C) - DU/DQ, DC, and DC Series.
 - 7. Fire Rated Frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.
 - 8. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

2.04 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
 - 2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
 - 3. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch- diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.
- B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:
 - 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
 - 2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

2.05 ACCESSORIES

- A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- B. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

2.06 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/NAAMM-HMMA 861 (Custom).
- C. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
 - 1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
 - 2. Aluminum Storefront and Curtain Wall Frame Anchors: welded frame pipe anchors at Countersunk fastener locations.
 - 3. Sidelite and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
 - 4. Equal Rabbet Frames: Provide frames with equal rabbet dimensions unless glazing and removable stops require wider dimensions on glass side of frame.
 - 5. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type

- hinges at top hinge locations.
6. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
 7. Provide countersunk, flat Phillips head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 8. Mortar Guards: Weld guard boxes to frame at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
 9. Electrical Thru-Wiring: Provide hollow metal frames receiving electrified hardware with concealed wiring harness and standardized Molex™ plug connectors on one end to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electric through-wire transfer hardware or wiring harness specified in hardware sets in Division 08 Sections "Door Hardware" and "Access Control Hardware."
 10. Electrical Knock Out Boxes: Factory weld 18 gauge electrical knock out boxes to frame for electrical hardware preps; including but not limited to, electric through wire transfer hardware, electrical raceways and wiring harnesses, door position switches, electric strikes, magnetic locks, and jamb mounted card readers as specified in hardware sets in Division 08 Sections "Door Hardware" and "Access Control Hardware".
 - a. Provide electrical knock out boxes with a dual 1/2-inch and 3/4-inch knockouts.
 - b. Conduit to be coordinated and installed in the field (Division 26) from middle hinge box and strike box to door position box.
 - c. Electrical knock out boxes to comply with NFPA requirements and fit electrical door hardware as specified in hardware sets in Division 08 Section "Door Hardware".
 - d. Electrical knock out boxes for continuous hinges should be located in the center of the vertical dimension on the hinge jamb.
 11. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
 12. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - 1) Two anchors per jamb up to 60 inches high.
 - 2) Three anchors per jamb from 60 to 90 inches high.
 - 3) Four anchors per jamb from 90 to 120 inches high.
 - 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
 - b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - 1) Three anchors per jamb up to 60 inches high.
 - 2) Four anchors per jamb from 60 to 90 inches high.
 - 3) Five anchors per jamb from 90 to 96 inches high.
 - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
 - 5) Two anchors per head for frames above 42 inches wide and mounted in metal-stud partitions.
 - c. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.
 13. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.

- a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- D. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.
- E. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
 - 1. Locate hardware as indicated on final Shop Drawings, or if not indicated, according to ANSI/NAAMM-HMMA 861.
 - 2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.
 - 3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
 - 4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.
- F. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
 - 1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
 - 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 - 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
 - 4. Provide loose stops and moldings on inside of hollow metal work.
 - 5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

2.07 STEEL FINISHES

- A. Preparation: Clean, treat and paint exposed surfaces of steel door and frame units, including galvanized surfaces. Clean steel surfaces of mill scale, rust, oil, grease, dirt and other foreign materials before application of paint.
- B. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.
 - 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.
 - 2. Primer for Fire Rated Doors: Tnemec Polyamide epoxy- Series 66 at 4 mils DFT at all fire-rated interior frame surfaces. Provide primer in different color than primer specified above. Do not apply asphaltic emulsion on fire rated doors.
 - 3. Apply asphaltic emulsion only on door frames to receive grout fill in masonry walls.

2.08 PAINT COLOR AND GLOSS:

- A. Refer to Division 09 Sections "Interior Painting."
 - 1. Color: As indicated in Finish Schedule on Drawings.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:
 - 1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - 2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - 3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - 4. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.
- C. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.03 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with 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, leaving surfaces smooth and undamaged.
 - a. At fire-protection-rated openings, install frames according to NFPA 80.
 - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - c. Install frames with removable glazing stops located on secure side of opening.
 - d. Install door silencers in frames before grouting.

- e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - f. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - g. Field apply bituminous coating to backs of frames that are filled with grout. Apply approximately 1/8 inch thick over shop primer and allow to thoroughly dry before handling or installation. Do not apply to fire-rated doors assemblies, use primer product specified in Part 2 "Steel Finishes" subparagraph above in lieu of asphaltic emulsion.
2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
3. Solidly pack mineral-fiber insulation inside frames.
4. Grouted Frames: Verify prior to proceeding with grouting if frames have not been treated with asphaltic emulsion in accordance with "Field apply bituminous..." subparagraph above under "Hollow Metal Frames" paragraph or at fire-rated door frames treatment with fire-rated epoxy primer.
5. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
7. In-Place Gypsum Board Partitions: Secure frames in place with postinstalled expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
8. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.
9. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/32 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/32 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/32 inch measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/32 inch, measured at jambs at floor.

3.04 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow metal work immediately after installation.
- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

- D. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

3.05 KEYNOTE SCHEDULE

- A. Products in this Specification Section are cited in the Drawings as KEYNOTES. See PART 2 - PRODUCTS for information on the following keynotes:

- 1.

<u>KEYNOTE</u>	<u>DESCRIPTION</u>
a. 081113.HMF	HOLLOW METAL FRAME

END OF SECTION 08 11 13

This page intentionally left blank

SECTION 08 14 16 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Solid-core doors with wood-veneer faces.
- B. Related Sections:
 - 1. Division 08 Section "Hollow Metal Doors and Frames" for door frames.
 - 2. Division 08 Section "Door Hardware" for door hardware.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of door indicated. Include details of core and edge construction, louvers, and trim for openings. Include factory-finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
 - 1. Indicate dimensions and locations of mortises and holes for hardware.
 - 2. Indicate dimensions and locations of cutouts.
 - 3. Indicate requirements for veneer matching.
 - 4. Indicate doors to be factory finished and finish requirements.
 - 5. Indicate fire-protection ratings for fire-rated doors.
- C. Samples for Initial Selection: For factory-finished doors.
- D. Samples for Verification:
 - 1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches for each material and finish. For each wood species and transparent finish, provide set of three samples showing typical range of color and grain to be expected in the finished work.
 - 2. Corner sections of doors, approximately 8 by 10 inches with door faces and edges representing actual materials to be used.
 - a. Provide samples for each species of veneer and solid lumber required.
 - b. Finish veneer-faced door samples with same materials proposed for factory-finished doors.
 - 3. Louver blade and frame sections, 6 inches long, for each material and finish specified.
 - 4. Frames for light openings, 6 inches long, for each material, type, and finish required.

1.03 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.

- B. Source Limitations: Obtain flush wood doors from single manufacturer.
- C. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, "Architectural Wood Flush Doors."
- D. Forest Certification: Provide doors made with cores and veneers obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship." (Sustainable Forestry Initiative (SFI) third party certification is also acceptable.)

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in plastic bags or cardboard cartons.
- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.06 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.07 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-in section.
 - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
 - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Approved Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Basis of Design: VT Industries Inc.; Clear rotary cut maple.
 - 2. Other pre-approved manufacturers meeting the specified requirements including, but not limited to:
 - a. Algoma Hardwoods, Inc.
 - b. Eggers Industries.
 - c. Marshfield Door Systems, Inc.
 - d. Vancouver Architectural Doors.

2.02 DOOR CONSTRUCTION, GENERAL

- A. Mineral-Core Doors:
 - 1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
 - 2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware.
 - 3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
 - a. Screw-Holding Capability: 550 lbf (Extra Heavy Duty) per WDMA T.M.-10.
- B. Structural-Composite-Lumber-Core Doors:
 - 1. Structural Composite Lumber: WDMA I.S.10.
 - a. Screw Withdrawal, Face: 700 lbf.
 - b. Screw Withdrawal, Edge: 400 lbf.

2.03 VENEERED-FACED DOORS FOR TRANSPARENT FINISH (NON-FIRE-RATED)

- A. Interior Solid-Core Doors:
 - 1. Grade: Premium, with Grade AA faces.
 - 2. Species: Maple.
 - 3. Cut: Clear rotary cut
 - 4. Match between Veneer Leaves: Slip match.
 - 5. Assembly of Veneer Leaves on Door Faces: Center-balance match.
 - 6. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
 - 7. Room Match: Provide door faces of compatible color and grain within each separate room or area of building.
 - 8. Transom Match: End match.
 - 9. Exposed Vertical and Top Edges: Same species as faces.
 - 10. Core: Either glued wood stave or structural composite lumber
 - 11. Construction: Five or seven plies. Stiles and rails are bonded to core, then entire unit abrasive planed before veneering.
 - 12. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.

2.04 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
 - 1. Comply with requirements in NFPA 80 for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
 - 1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
 - 2. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
- C. Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.

1. Fabricate door and transom panels with full-width, solid-lumber, rabbeted, meeting rails. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.
- D. Openings: Cut and trim openings through doors in factory.
 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 Division 08 Section "Glazing."

2.05 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Finish doors at factory.
 1. See Finish Schedule on Drawings for color.
- C. Transparent Finish:
 1. Grade: Premium.
 2. Finish: AWI conversion varnish or catalyzed polyurethane system.
 3. Finish: WDMA TR-4 conversion varnish or TR-6 catalyzed polyurethane.
 4. Effect: Semifilled finish, produced by applying an additional finish coat to partially fill the wood pores.
 5. Sheen: Satin.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine doors and installed door frames before hanging doors.
 1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Hardware: For installation, see Division 08 Section "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.
 1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.
- C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
 1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors.
Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.

- a. Comply with NFPA 80 for fire-rated doors.
 - 2. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
 - 3. Bevel fire-rated doors 1/8 inch in 2 inches at lock edge; trim stiles and rails only to extent permitted by labeling agency.
- D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.03 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.

3.04 KEYNOTE SCHEDULE

- A. Products in this Specification Section are cited in the Drawings as KEYNOTES. See PART 2 - PRODUCTS for information on the following keynotes:
- 1.

<u>KEYNOTE</u>	<u>DESCRIPTION</u>
a. 081416.SCD	SOLID CORE DOOR

END OF SECTION 08 14 16

This page intentionally left blank

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Interior gypsum board.
- B. Related Sections:
 - 1. Division 06 Section "Rough Carpentry" for blocking.
 - 2. Division 07 Section "Thermal Insulation" for insulation installed in assemblies that incorporate gypsum board.
 - 3. Division 07 Section "Joint Sealants" for joint sealers.
 - 4. Division 07 Section "Acoustical Joint Sealers" for acoustical joint sealers.
 - 5. Division 09 Section "Non Structural Metal Framing" for non-structural framing, suspension systems that support gypsum board, and blocking.
 - 6. Division 09 painting Sections for primers applied to gypsum board surfaces.

1.02 REFERENCE STANDARDS

- A. ASTM International (ASTM)
 - 1. ASTM C 473 - Standard Test Methods for Physical Testing of Gypsum Panel Products
 - 2. ASTM C 475 - Standard Specification for Joint Compound and Joint Tape for Finishing
 - 3. ASTM C 514 - Standard Specifications for Nails for the Application of Gypsum Board
 - 4. ASTM C 840 - Standard Specification for Application and Finishing of Gypsum Board
 - 5. ASTM C 919 - Standard Practice for Use of Sealants in Acoustical Applications
 - 6. ASTM C 1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
 - 7. ASTM C 1177 - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
 - 8. ASTM C 1178 - Standard Specification for Coated Glass Mat Water Resistant Gypsum Backing Panel
 - 9. ASTM C 1280 - Standard Specification for Application of Gypsum Sheathing
 - 10. ASTM C 1325 - Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units
 - 11. ASTM C 1396 - Standard Specification for Gypsum Board
 - 12. ASTM C 1629 - Standard Classification for Abuse Resistant Nondecorated Interior Gypsum Panel Products and Fiber reinforced Cement Panels
 - 13. ASTM C 1658 - Standard Specification for Glass Mat Gypsum Panels
 - 14. ASTM D 3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
 - 15. ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction
 - 16. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials

17. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
 18. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials
 19. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials
 20. ASTM E 695-03 - Standard Test Method of Measuring Relative Resistance of Wall, Floor, and Roof Construction to Impact Loading
- B. Gypsum Association (GA)
1. GA-214 - Recommended Levels of Gypsum Board Finish
 2. GA-216 - Application and Finishing of Gypsum Panel Products
 3. GA-231 - Assessing Water Damage to Gypsum Board
 4. GA-238 - Guidelines for the Prevention of Mold Growth on Gypsum Board
 5. GA-253 - Application of Gypsum Sheathing
 6. GA-801 - Handling and Storage of Gypsum Panel Products: A Guide For Distributors, Retailers, and Contractors
- C. The Gypsum Construction Handbook by USG - latest edition.

1.03 SUBMITTALS

- A. Product Data: Submit manufacturer's current technical literature for each component.
- B. Samples: For the following products:
1. Board: Submit sample of each panel product specified, 4 inches x 6 inches.
 2. Trim Accessories: Full-size Sample in 12-inch long length for each trim accessory indicated.
- C. Design Data, Test Reports: Provide manufacturer test reports indicating product compliance with indicated requirements.
- D. Manufacturer Instructions: Provide manufacturer's written installation instructions.
- E. Closeout Submittals: Refer to Division 01 Section "Execution and Closeout Requirements."

1.04 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain gypsum board products from a single manufacturer, or from manufacturers recommended by the prime manufacturer of gypsum board.
- B. Pre-Installation Conference: Schedule meeting, no less than ten (10) days prior to installation of gypsum board; with Owner, Contractor, insulation firestopping /sealant / acoustical/ plaster / drywall installers, mechanical and electrical contractors, and Architect / Acoustical Consultant in attendance.
- C. Agenda: Review details of acoustically rated assemblies, such as wall interfacing, expansion joint locations, sealant work, firestopping, sound insulation envelopes, and mechanical / electrical penetrations.
- D. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- E. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified

according to ASTM E 413 by an independent testing agency.

- F. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Install mockups for the following:
 - a. Each level of gypsum board finish indicated for use in exposed locations including.
 - 1) One wall area with Level Four finish.
 - 2) One wall area with Level Three finish.
 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. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- G. Test any products from non-USA countries to verify that products do not contain asbestos. Submit documentation.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic and other causes in accordance with GA-238 and manufacturer recommendations. Stack product flat to prevent sagging. In addition, follow guidelines found in GA-801.

1.06 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements, GA-216 requirements, or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install interior products intended to stay dry until installation areas are enclosed and conditioned. Products with exposure warranties can be installed per manufacturer recommendations.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are 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

2.01 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.

2.02 GYPSUM BOARD, GENERAL

- A. Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.03 INTERIOR GYPSUM BOARD

- A. Gypsum Board, Type X: ASTM C1396/C1396M.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide CertainTeed; SAINT-GOBAIN; CertainTeed Type X Gypsum Board or a comparable product by one of the following:
 - a. Georgia-Pacific Gypsum LLC.
 - b. National Gypsum Company.
 - c. PABCO Gypsum.
 - d. USG Corporation.
 - 2. Thickness: 5/8 inch (15.9 mm).
 - 3. Long Edges: Tapered.
- B. Gypsum Ceiling Board: ASTM C1396/C1396M.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide CertainTeed; SAINT-GOBAIN; CertainTeed Interior Ceiling Gypsum Board or a comparable product by one of the following:
 - a. Georgia-Pacific Gypsum LLC.
 - b. National Gypsum Company.
 - c. PABCO Gypsum.
 - d. USG Corporation.
 - 2. Thickness: 1/2 inch (12.7 mm).
 - 3. Long Edges: Tapered.
- C. Mold-Resistant Gypsum Board: ASTM C1396/C1396M. With moisture- and mold-resistant core and paper surfaces.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide CertainTeed; SAINT-GOBAIN ; CertainTeed M2Tech Mold and Moisture Resistant Type X Gypsum Board. or a comparable product by one of the following:
 - a. Georgia-Pacific Gypsum LLC.
 - b. National Gypsum Company.
 - c. PABCO Gypsum.
 - d. USG Corporation.
 - 2. Core: 5/8 inch (15.9 mm), Type X.
 - 3. Long Edges: Tapered.
 - 4. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.04 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 - 1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
 - 2. Shapes:
 - a. Corner bead.

- 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 Corner-bead: With notched or flexible flanges.
- B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
 - 1. Basis of Design: Fry Reglet Corp.,
 - a. "Z" Reveal Molding; Fry # DRMZ-625-25.
 - b. "F" Reveal Molding; Fry # FDM-625-50.
 - 2. Other Compatible manufacturer:.
 - a. Gordon, Inc.
 - b. Pittcon Industries.
 - 3. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221, Alloy 6063-T5.
 - 4. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

2.05 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 - 1. Interior Gypsum Wallboard: Paper.
 - 2. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
 - 3. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats. Light Weight joint compounds are not allowed.
 - 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
 - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 - 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
 - 4. Finish Coat: For third coat, use setting-type, sandable topping or drying-type, all-purpose compound.
 - 5. Moisture-Resistant Gypsum Board: Use setting-type taping compound and setting-type, sandable topping compound.

2.06 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
 - 1. Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to wood and 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 C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
 2. Recycled Content: Provide blankets with recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content constitutes a minimum of 10 percent by weight.
- E. Vapor Retarder: As specified in Division 07 Section "Thermal Insulation."

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames and framing, for compliance with requirements and other conditions affecting performance.
- 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.

3.02 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
 2. Fit gypsum panels around ducts, pipes, and conduits.

3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch-wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members, or provide control joints to counteract wood shrinkage.
- I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings. Install acoustical putty behind electrical outlets and comply with manufacturer's printed recommendations for maintaining full coverage of the outlet box and associated wiring.
- J. Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.

3.03 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 1. Type X: At all locations unless otherwise indicated.
 2. Ceiling Type: Ceiling surfaces.
 3. Impact Resistant Type: As indicated on Drawings.
 4. Moisture- and Mold-Resistant Type: All inside surfaces of exterior walls- Typical.
 5. Moisture Resistant Type: Install behind FRP and at exposed wall areas of restrooms and kitchens.
- B. Single-Layer Application:
 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.
 2. On partitions/walls, apply gypsum panels vertically (parallel to framing) or horizontally (perpendicular to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.
 3. On Z-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 1 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-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.

3.04 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
 1. Cornerbead: Use at outside corners.
 2. Bullnose Bead: Use where indicated.
 3. LC-Bead: Use at exposed panel edges.
 4. L-Bead: Use where indicated.
- D. Aluminum Trim: Install in locations indicated on Drawings.

3.05 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 those with trim having flanges not intended for tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 1. Level 4: At all panel surfaces that will be exposed to public view and at all concealed locations such as behind casework, chalkboards, whiteboards, tackboards and markerboards.
 2. Level 3: In accordance with referenced standard and as follows:
 - a. Partial Finishing: Omit third coat and sanding on drywall work in attics, interstitial spaces, and elsewhere as approved by Architect. The two-coat system applied to these areas is required to be smooth and uniform.
- E. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.

3.06 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. 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.

3.07 KEYNOTE SCHEDULE

- A. Products in this Specification Section are cited in the Drawings as KEYNOTES. See PART 2 - PRODUCTS for information on the following keynotes:

1.	<u>KEYNOTE</u>	<u>DESCRIPTION</u>
a.	092900.CB	CORNERBEAD
b.	092900.CJ	CONTROL JOINT
c.	092900.GWB	GYPSUM WALL BOARD TYPE X
d.	092900.GWB	GYPSUM WALL BOARD
e.	092900.JM	'J' MOULDING
f.	092900.LM	'L' MOULDING
g.	092900.MRG	MOISTURE-RESISTANT GYPSUM WALL BOARD

END OF SECTION 09 29 00

This page intentionally left blank

SECTION 09 30 00 - TILING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Ceramic tile.
 - 2. Grout.
 - 3. Waterproof membrane.
 - 4. Crack isolation membrane.
 - 5. Tile backing panels.
 - 6. Metal Edge Strips.
- B. Related Sections:
 - 1. Division 03 Section "Cast-in-Place Concrete" for monolithic slab finishes specified for tile substrates.
 - 2. Division 07 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
 - 3. Division 09 Section "Gypsum Board."

1.02 DEFINITIONS

- A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in "American National Standard Specifications for Installation of Ceramic Tile."
- C. Module Size: Actual tile size plus joint width indicated.
- D. Face Size: Actual tile size, excluding spacer lugs.
- E. TCNA - Tile Council of North America; "TCNA Handbook for Ceramic, Glass, and Stone Tile Installation."

1.03 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples for Initial Selection: For each type of tile and grout indicated. Include Samples of accessories involving color selection.
- D. Samples for Verification:
 - 1. Full-size units of each type and composition of tile and for each color and finish required. For ceramic mosaic tile in color blend patterns, provide full sheets of

- each color blend.
- 2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 12 inches square, but not fewer than 4 tiles. Use grout of type and in color or colors approved for completed Work.
- 3. Full-size units of each type of trim and accessory for each color and finish required.
- 4. Metal edge strips in 6-inch lengths.
- E. Qualification Data: For qualified Installer.
- F. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- G. Product Certificates: For each type of product, signed by product manufacturer.
- H. Product Test Reports: For tile-setting and -grouting products and certified porcelain tile.

1.04 QUALITY ASSURANCE

- A. Installer's qualifications:
 - 1. Manufacturer's approval of trained installer for Manufacturer's warranty period specified.
 - 2. Certified Member of TCAA-Trowel of Excellence Program- Demonstrating a track record of a minimum of five similar size tile projects over the past five years.
- B. Source Limitations for Tile: Obtain tile of each type and color or finish from one source or producer.
 - 1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- C. Source Limitations for Setting and Grouting Materials: In order to protect the warranty, obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.
- D. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:
 - 1. Waterproof membrane.
 - 2. Crack isolation membrane.
 - 3. Joint sealants.
 - 4. Cementitious backer units.
- E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockup of each type of floor tile installation.
 - 2. Build mockup of each type of wall tile installation.
 - 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.
- F. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.
- E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.06 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

1.07 EXTRA MATERIALS

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
 - 2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.08 WARRANTY

- A. Installation Systems Warranty: Provide setting mortar, waterproofing, anti-fracture membrane and grout materials from the same manufacturer in order to provide a warranty below.
 - 1. Warranty Period: Lifetime by Manufacturer of setting, fracture isolation and waterproofing materials.
 - 2. Special Warranty: by installer against defective or poor workmanship for five years from Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Dynamic Coefficient of Friction (DCOF): For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ANSI A137.1, DCOF AcuTest:
 - 1. Level Surfaces: Minimum 0.42, wet.
 - 2. Step Treads: Minimum 0.42, wet.

2.02 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
 - 1. Provide tile complying with Standard grade requirements unless otherwise indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.
 - 1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.
- E. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.03 TILE PRODUCTS

- A. Ceramic Tile Type CT-1:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Daltile; Scriptor Rebel AR63, or a comparable product by one of the following:
 - a. American Olean; a brand of Dal-Tile Corporation.
 - b. Florida Tile, Inc.
 - c. Interceramic.
 - d. Marazzi USA; a brand of Dal-Tile Corporation.
 - e. Mosa.
 - 2. Composition: Glazed porcelain.
 - 3. Module Size: 12 x 24 inch.
 - 4. Face Size: 11-5/8 by 23-3/8 inches.
 - 5. Thickness: 5/16 inch.
 - 6. Face: Plain with square or cushion edges.
 - 7. Tile Pattern and Color:
 - a. Pattern: See Drawings for Tile Pattern.
 - b. Color: See Finish Schedule on Drawings.
 - 8. Grout Joint: 3/16 inch.
 - 9. Grout Color: See Finish Schedule on Drawings.
- B. Ceramic Tile Type CT-2:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Daltile; Scriptor Tile Oracle AR60, or a comparable product by one of the following:
 - a. American Olean; a brand of Dal-Tile Corporation.

- b. Florida Tile, Inc.
 - c. Interceramic.
 - d. Marazzi USA; a brand of Dal-Tile Corporation.
 - e. Mosa.
2. Composition: Glazed porcelain.
3. Module Size: 12 x 24 inch.
4. Face Size: 11-13/16 by 23-13/16 inches.
5. Thickness: 5/16 inch.
6. Face: Plain with square or cushion edges.
7. Tile Pattern and Color:
 - a. Pattern: See Drawings for Tile Pattern.
 - b. Color: See Finish Schedule on Drawings.
8. Grout Joint: 3/16 inch.
9. Grout Color: See Finish Schedule on Drawings.

2.04 METAL EDGE STRIPS

- A. Basis-of-Design Manufacturer: Subject to compliance with requirements, provide products from Schluter Systems L.P. or comparable products by one of the following:
 1. Blanke Corporation.
 2. Ceramic Tool Company, Inc.
- B. Floor transition:
 1. Schluter®-RENO-U: Description: profile with sloped exposed surface, 5/16" tall leading edge, as indicated or as required, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.
 - a. Material and Finish: EB - Brushed Stainless Steel Type 304 = V2A.
 - b. Height as required.
 2. Schluter®-SCHIENE: Description: profile with sloped exposed surface, 5/16" tall leading edge as indicated or as required, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.
 - a. Material and Finish: EB - Brushed Stainless Steel Type 304 = V2A.
 - b. Height as required.
 3. Schluter®-RENO-TK: Description: profile with sloped exposed surface, 1/4 inch deep channel, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.
 - a. Material and Finish: AE - Satin Anodized Aluminum.
 - b. Height as required.
 - c. Installation: ADA compliant.
 4. Transitions greater than 1/2 inch: Schluter®-RAMP: Anodized aluminum profile with textured, sloped exposed surface, tapered leading edge, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.
 - a. Material and Finish: AE - Satin Anodized Aluminum.
 - b. Height: As required.
 - c. Ramp Length: As required.
 - d. Installation: ADA compliant.
 5. See Floor Finish Details in Drawings for metal edge strip transitions between floor areas of varying materials.
 6. Material, finish, and color to be selected by Architect from manufacturer's standard range.
 7. All transitions shall be ADA Compliant.
- C. Coved Base: Schluter®-DILEX-AHKA: Description: Anodized aluminum profile with single integrated trapezoid perforated anchoring leg and dovetailed channel, connected

at a 90 degree angle by a cove-shaped 3/8" (10 mm) radius section that forms the visible surface.

1. Material and Finish: AE - Satin Anodized Aluminum
2. Height: As required.
3. Corners:
 - a. Provide with matching inside corners.
 - b. Provide with matching outside corners.
 - c. Provide with matching end cap.

2.05 TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 or ASTM C 1325, in maximum lengths available to minimize end-to-end butt joints.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Custom Building Products; Wonderboard Backerboard.
 - b. USG Corporation; DUROCK Cement Board.
 - c. Or Approved.
 2. Thickness: 1/2 inch.
- B. Glass-Mat Tile Backerboard:
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. USG Corporation; DUROCK Glass-Mat Tile Backerboard.
 - b. Or Approved.
 2. Thickness: 5/8 inch.

2.06 WATERPROOFING AND CRACK ISOLATION

- A. Fluid-Applied Waterproofing Membrane (WM): Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10; use where waterproofing is indicated on concrete substrates.
 1. Crack Resistance: No failure at 1/16 inch gap, minimum; comply with ANSI A118.12.
 2. Fluid or Trowel Applied Type:
 - a. Material: Synthetic rubber or Acrylic.
 - b. Thickness: 25 mils, minimum, dry film thickness.
 - c. Products:
 - 1) ARDEX Engineered Cements; ARDEX 8+9 or Ardex S1K one component waterproofing and crack isolation membrane: www.ardexamericas.com/#sle.
 - 2) Custom Building Products; RedGard Crack Prevention and Waterproofing Membrane: www.custombuildingproducts.com.
 - 3) LATICRETE International, Inc; LATICRETE HYDRO BAN: www.laticrete.com/#sle.
- B. Crack Isolation Membrane (CIM) Uncoupling Mat: Corrugated Polyethylene: Corrugated polyethylene with dovetail-shaped corrugations and with anchoring webbing on the underside; 3/16-inch nominal thickness.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide Schluter Systems L.P; DITRA or a comparable product by one of the following:
 - a. ARDEX Americas; ARDEX UI 740 FLEXBONE Uncoupling Membrane.
 - b. Or approved.

2.07 SETTING MATERIALS

- A. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Custom Building Products; MegaFlex Crack Prevention Mortar or comparable product by one of the following:
 - a. Ardex Americas.
 - b. Laticrete International, Inc.
 - c. Or Approved.
 - 2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
 - 3. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide Custom Building Products; MegaLite Rapid Set Crack Prevention Mortar or comparable product by one of the following:
 - b. Ardex Americas.
 - c. Laticrete International, Inc.
 - d. Or approved.
- B. Portland cement Mortar (Thickset) Installation Materials: ANSI A108.02.
 - 1. Cleavage Membrane: Asphalt felt, ASTM D 226, Type I (No. 15); or polyethylene sheeting, ASTM D 4397, 6.0 mils thick.
 - 2. Reinforcing Wire Fabric: Galvanized, welded wire fabric, 2 by 2 inches by 0.062-inch diameter; comply with ASTM A 185 and ASTM A 82 except for minimum wire size.
 - 3. Expanded Metal Lath: Diamond-mesh lath complying with ASTM C 847.
 - a. Base Metal and Finish for Interior Applications: Uncoated or zinc-coated (galvanized) steel sheet, with uncoated steel sheet painted after fabrication into lath.
 - b. Base Metal and Finish for Exterior Applications: Zinc-coated (galvanized) steel sheet.
 - c. Configuration over Studs and Furring: Flat.
 - d. Configuration over Solid Surfaces: Self furring.
 - e. Weight: 2.5 lb/sq. yd.
 - 4. Latex Additive: Manufacturer's standard acrylic resin water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement and aggregate mortar bed.

2.08 GROUT MATERIALS (GR)

- A. Water-Cleanable Epoxy Grout: ANSI A118.3, with a VOC content of 65 g/L or less.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Custom Building Products; CEG-Lite 100% Solids Commercial Epoxy Grout or a comparable product by one of the following:
 - a. ARDEX Americas.
 - b. Laticrete International, Inc.
 - c. MAPEI Corporation.

2.09 ELASTOMERIC SEALANTS

- A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Division 07 Section "Joint Sealants."

1. Use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Use primers, backer rods, and sealant accessories recommended by sealant manufacturer.
- B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.
- C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.

2.10 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Temporary Protective Coating: Product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
1. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.
- C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Custom Building Products; TileLab Grout & Tile Cleaner for ceramic, or Tile Lab Marble & Stone Ph Neutral Cleaner or AquaMix Grout & Tile Cleaner for natural stone, or comparable product by one of the following:
 2. Or approved.

2.11 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
 2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
 3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.
- B. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
1. Treat cracks exceeding 1/8 inch in accordance with TCNA F125 or TCNA F125A.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.
- D. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, pre-coat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.
- E. Do not "overwhip" the adhesive mix. Use a mixer that is less than 200 RPM.

3.03 TILE INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:
 - a. Tile floors in wet areas.
 - b. Tile floors composed of tiles 8 by 8 inches or larger.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile

work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
 2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
 3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- E. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
1. Ceramic Mosaic Tile: 1/8 inch.
 2. Glazed Wall Tile: 1/8 inch.
 3. Or as indicated on Drawings.
- F. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- G. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated by Reference Standards. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
 2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

3.04 TILE BACKING PANEL INSTALLATION

- A. Install cementitious backer units and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated.
- B. Use latex-portland cement mortar for bonding material unless otherwise directed in manufacturer's written instructions.
- C. Fasten to stud partitions per manufacturer's recommendations. Fasten only with corrosion resistant screws. Install to framing with long dimension parallel to framing. Center end or edge joints on framing and plates. Fit edges closely, but not forced together. Fasten boards to framing with 1-5/8 inch screws, Type "S" spaced 6 inches on center. Space fasteners at least 3/8 inch from edge of board.
- D. If necessary, provide additional blocking to permit proper attachment.
- E. Apply 2 inch glass fiber tape over joints and corners; embed with tile-setting mortar. (Note- Some backerboard manufacturers do not require the use of 2 inch fiber tape where units are joined on floor installations. Refer to the manufacturers' technical data sheet for the joint treatment recommendations.

3.05 WATERPROOFING AND CRACK PREVENTION MEMBRANE INSTALLATION

- A. Install waterproofing and crack prevention membrane to comply with ANSI A108.13 and A108.17 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.
- B. Allow waterproofing and crack prevention membrane to cure and verify by testing that it is watertight before installing tile or setting materials over it.

3.06 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 - 1. Remove latex-Portland cement grout residue from tile as soon as possible.
 - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
 - 3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.
- B. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- D. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.07 INTERIOR TILE INSTALLATION SCHEDULE

- A. Floor Tile Installation: Thin-set mortar on crack isolation/waterproof membrane; TCNA F128.
 - 1. Thin-Set Mortar: Latex-portland cement mortar.
 - 2. Tile Type: Porcelain/ceramic and quarry tile.
 - 3. Waterproofing and crack prevention uncoupling membrane.
 - 4. Grout: Epoxy grout.
- B. Wall Tile Installation: Wood or metal studs (min. 20 ga.) and cement backer board; TCNA W244C.
 - 1. Bond Coat Mortar for Wet-Set Method: Latex-portland cement mortar.
 - 2. Tile Type: Porcelain/ceramic and glass tile.
 - 3. Grout: Epoxy grout.

3.08 KEYNOTE SCHEDULE

- A. Products in this Specification Section are cited in the Drawings as KEYNOTES. See PART 2 - PRODUCTS for further information on the following keynotes:
 - 1.

<u>KEYNOTE</u>	<u>DESCRIPTION</u>
a. 093000.CT	CERAMIC TILE

END OF SECTION 09 30 00

This page intentionally left blank

SECTION 09 51 13 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Acoustical Ceiling Tiles for panel ceiling systems.
 - 2. Metal Suspension Systems.
 - 3. Wire hangers, main runners and cross tees.
 - 4. Metal Edge Mouldings.
- B. Related Sections:
 - 1. Division 21 "Fire Suppression" Sections for sprinkler heads penetrating ceiling assemblies.
 - 2. Division 23 "Heating, Ventilating & Air Conditioning" Sections for HVAC registers penetrating ceiling assemblies.
 - 3. Division 26 "Electrical" Sections for electrical fixtures penetrating ceiling assemblies.
- C. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete at ceilings.

1.02 DEFINITIONS

- A. CAC: Ceiling Attenuation Class.
- B. LR: Light Reflectance coefficient.
- C. NRC: Noise Reduction Coefficient.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. 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 and or .
 - 2. Method of attaching hangers to building structure.
 - a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
 - 3. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
 - 4. Minimum Drawing Scale: 1/4 inch = 1 foot.
- C. Samples for Initial Selection: For components with factory-applied color finishes.
- D. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
 - 1. Acoustical Panel: Set of 6-inch- square Samples of each type, color, pattern, and texture.

1.04 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For acoustical testing agency.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each acoustical panel ceiling.
- C. Maintenance Data: For finishes to include in maintenance manuals.

1.05 QUALITY ASSURANCE

- A. Acoustical Testing Agency Qualifications: An independent testing laboratory, or an NVLAP-accredited laboratory, with the experience and capability to conduct the testing indicated. NVLAP-accredited laboratories must document accreditation, based on a "Certificate of Accreditation" and a "Scope of Accreditation" listing the test methods specified.
- B. Source Limitations:
 - 1. Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer.
 - 2. Suspension System: Obtain each type through one source from a single manufacturer.
- C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.07 PROJECT CONDITIONS

1.08 COORDINATION

- A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.09 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Acoustical Ceiling Panels: Full-size panels equal to 2.0 percent of quantity installed.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Design and installation is required to comply with ASTM E580 as modified by ASCE 13.5.6.2.2(a-c). Suspended ceilings installed per NWCB TB 401 are an approved method.
- B. Seismic Performance: Comply to current code requirements and local jurisdictional codes for this project location. Below are design requirements for ceiling system support and seismic restraint calculations and details. The design criteria are as follows:
 - 1. IBC Seismic Design Category: Meet the requirements of the IBC code providing a Heavy-Duty Grid (min. 16 lbs./ft.) with a minimum perimeter edge angle flange width of 2 inches and installed within the following standards:
 - a. Standard for Ceiling Suspension Systems Requiring Seismic Restraint: Comply with ASTM E 580.
 - b. CISCAs Guidelines for Systems Requiring Seismic Restraint: Comply with CISCAs "Guidelines for Seismic Restraint of Direct-Hung Suspended Ceiling Assemblies--Seismic Zones 3 & 4."
 - c. ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads."
- C. 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.

2.02 ACOUSTICAL PANELS AND TILES

- A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectance, unless otherwise indicated.
- B. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.
 - 1. Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.
- C. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

2.03 ACOUSTICAL PANELS AND TILES FOR ACOUSTICAL CEILINGS (ACT)

- A. Mineral Fiber and Fiberglass Ceiling Tiles: 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. Armstrong World Industries, Inc.
 - 2. CertainTeed Corporation; Saint-Gobain North America.

3. Rockfon (Rockwool International).
4. USG Corporation.

B. Acoustical Panel Types:

1. Type ACT1 - Basis-of-Design Panel Types: Subject to compliance with requirements, provide Armstrong World Industries; School Zone Fine Fissured #1714, or comparable products by one of the available manufacturers.
 - a. Classification (ASTM E1264): Type: III, Form: 2, Pattern: C E
 - b. Size: 24 inch by 48 inch by 3/4 inch.
 - c. Profile: 15/16 inch square lay-In.
 - d. Material: Wet-formed mineral fiber, medium textured panel. Contains a broad-spectrum antimicrobial additive on the face and back of the panel that provides resistance against the growth of mold and mildew. Includes sag-resistance performance.
 - e. Recycled Content: .54%
 - f. Fire Performance: Class A (UL).
 - g. Sound Absorption (NRC): 0.70.
 - h. Sound Blocking (CAC): 40
 - i. Articulation Class (AC): 180.
 - j. Light Reflectance (LR): 82%
 - k. Color: White.
 - l. Grid: Armstrong World Industries; Prelude 15/16" Exposed Tee, white.

- C. Antimicrobial Treatment: Broad spectrum fungicide and bactericide based.

2.04 EXPOSED TEE GRID SYSTEM

- A. Exposed Tee Grid System: Armstrong World Industries heavy-duty class grid systems indicated for ceiling types listed above or approved.
1. Color: White, or as otherwise indicated in Finish Schedule on Drawings.

2.05 METAL SUSPENSION SYSTEMS, GENERAL

- A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.
- B. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard pure white (off-white not acceptable) factory-applied matte finish for type of system indicated. For other applications and unless otherwise noted.
- C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 2. Size: Select wire diameter so its stress at 3 times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.135-inch- diameter wire.
- E. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.

- F. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch-thick, galvanized steel sheet complying with ASTM A 653/A 653M, G90 coating designation; with bolted connections and 5/16-inch- diameter bolts.
- 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.
- I. Seismic Clips: Manufacturer's standard seismic clips designed and spaced to secure acoustical panels in-place.
- J. Hold-Down Clips: Where indicated, provide manufacturer's standard hold-down clips spaced 24 inches o.c. on all cross tees.

2.06 METAL SUSPENSION SYSTEM FOR ACOUSTICAL PANEL CEILING (MSS)

- A. Basis-of-Design Products: Subject to compliance with requirements, provide Armstrong World Industries; Prelude XL 15/16" Exposed Tee in white, or comparable products by one of the following:
 - 1. CertainTeed Corporation; Saint-Gobain North America.
 - 2. Rockfon (Rockwool International).
 - 3. USG Corporation.
- B. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 coating designation, with prefinished 15/16-inch- wide metal caps on flanges.
 - 1. Structural Classification: Heavy-duty system.
 - 2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
 - 3. Face Design: Flat, flush.
 - 4. Cap Material: Steel cold-rolled sheet.
 - 5. Cap Finish: Provide manufacturer's pure white (off-white not acceptable) matte finish for exposed type of system indicated, unless otherwise required.

2.07 METAL EDGE MOLDING (MEM)

- A. Extruded Aluminum Perimeter Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.
 - 1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners, unless otherwise indicated.
 - 2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
 - 3. Standard Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; organic coating: as specified below). Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.
 - a. Organic Coating: Thermosetting, primer/topcoat system with a minimum dry film thickness of 0.8 to 1.2 mils.

B. Penetration Escutcheon and Trim:

1. Provide penetration escutcheon(s) for penetration(s) of acoustical panel ceiling panels. Use penetrating material/assembly manufacturer's standard escutcheon if escutcheon covers penetration hole at perimeter of penetration. Where escutcheon is not provided by penetrating material/assembly manufacturer provide material matching perimeter trim for the exposed dimension and in same color/finish as trim. Where penetration occurs in field of panel provide components allowing for non-visible support of escutcheon that allows removal and reinstallation as required. Provide escutcheons sized for penetrations in compliance with seismic regulations, if not otherwise indicated in Contract Documents.
2. Provide perimeter trim of acoustical panel ceiling panels where penetrated in panel field or at edges. Use ceiling panels manufacturer's specified trim in color and finish, matching in exposed dimension except those requiring oversized dimension(s). Where penetration occurs in field of panel provide components for non-visible support of trim that allows removal and reinstallation as required. Provide perimeter trim in compliance with seismic regulations, if not otherwise indicated in Contract Documents.

2.08 ACOUSTICAL SEALANT

A. Products: Subject to compliance with requirements, provide one of the following:

1. Acoustical Sealant for Exposed and Concealed Joints:
 - a. Pecora Corporation, AC-20 FTR Acoustical and Insulation Sealant.
 - b. USG Corporation, SHEETROCK Acoustical Sealant.
 - c. Or Approved
2. Acoustical Sealant for Concealed Joints:
 - a. Pecora Corporation; BA-98.
 - b. Tremco, Inc.; Tremco Acoustical Sealant.
 - c. USG Corporation.

B. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), complying with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

C. Acoustical Sealant for Concealed Joints: Manufacturer's standard nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), recommended for sealing interior concealed joints to reduce airborne sound transmission.

PART 3 - EXECUTION

3.01 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.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.03 INSTALLATION

- A. General: Install acoustical panel ceilings to comply with ASTM C 636 and seismic design requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. Suspend ceiling hangers from building's structural members and as follows:
 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 3. Splay hangers only where required and to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 4. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 5. Secure wire hangers to ceiling suspension members and to supports above with a minimum of four tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 6. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both structure to which hangers are attached and type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
 7. Do not support ceilings directly from roof deck.
 8. When wood framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 9. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 6 inches from ends of each member.
 10. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to roof deck.
- 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, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install penetration escutcheons and trim where acoustical ceiling panels are penetrated. No exposed unfinished edges allowed.
- F. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- G. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
1. Arrange directionally patterned acoustical panels as follows:
 - a. As indicated on reflected ceiling plans.
 2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
 3. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
 4. 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.
 5. 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.
 6. Install hold-down clips in areas indicated, in areas required by authorities having jurisdiction; space as recommended by panel manufacturer's written instructions, unless otherwise indicated.

3.04 FIELD QUALITY CONTROL

- A. Special Inspections: Owner may engage a qualified special inspector to perform the following special inspections and prepare reports:
1. Suspended ceiling system.
 2. Hangers, anchors and fasteners.

3.05 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

3.06 KEYNOTE SCHEDULE

- A. Products in this Specification Section are cited in the Drawings as KEYNOTES. See PART 2 - PRODUCTS for information on the following keynotes:

1.	KEYNOTE	DESCRIPTION
a.	095113.ACT	ACOUSTICAL CEILING TILE
b.	095113.AP	ACOUSTICAL PANEL
c.	095113.AS	ACOUSTICAL SEALANT
d.	095113.FCE	FLOATING CEILING EDGE TRIM
e.	095113.MEM	METAL EDGE MOULDING

Beaverton SD Facility Office Renovation
Beaverton School District
BLRB Project No.: 23030

Permit/Bid Set
April 17, 2023

- f. 095113.MSS METAL SUSPENSION SYSTEM
- g. 095113.PT PERIMETER TRIM
- h. 095113.WH WIRE HANGER

END OF SECTION 09 51 13

This page intentionally left blank

SECTION 09 61 05 - VAPOR CONTROL FOR FLOORING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Fluid applied concrete floor sealer for control of moisture vapor transmission and alkalinity where floor covering will be installed.
- B. Related Sections:
 - 1. Division 03 Section "Cast-In Place Concrete" for concrete installation and curing requirements.
 - 2. Division 09 Section "Carpeting".
 - 3. Division 09 Sections: Coordinate with floor finish materials specifications for substrate preparation and installation requirements so that Work of this Section is performed prior to installation of floor finish materials.

1.03 REFERENCES

- A. ASTM D1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes.
- B. ASTM D1653 - Standard Test Methods for Water Vapor Transmission of Organic Coating Films.
- C. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.

1.04 SUBMITTALS

- A. Product data for each material specified including:
 - 1. Installation Instructions.
 - 2. Independent Test Data.
 - 3. Certification Requirements.
 - 4. Warranty Information.
- B. Manufacturer's certification that material for this Section has been tested in accordance with ASTM D1653 and has a perm rating of less than 0.05.
- C. List of product use and performance history, for the same formulation and system design, listing reference sources.

1.05 QUALITY ASSURANCE

- A. Qualifications of Applicator:
 - 1. Approved by manufacturer subject to inspection and control of the manufacturer, experienced in surface preparation and application of material.

2. No less than 5 years experience installing materials.

B. Manufacturer's Qualification:

1. Similar projects shall have documented minimum initial moisture vapor emission rate (MVER) of 15 lbs. per 1,000 sf per 24 hrs, and have resulted in maintained MVER equal to or less than 3 lbs. per 1,000 sf per 24 hrs when tested to ASTM F1869-98 or an RH value of 95 percent or less when measured per ASTM F2170.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to the job site in their original unopened containers, clearly labeled with manufacturer's name and brand designation.
- B. Store products in an approved ventilated dry area; protect from dampness, freezing, and direct sun light in areas with temperature range between 50 and 90 degrees F.
- C. Handle product in a manner that will prevent breakage of containers and damage to products.

1.07 PROJECT/SITE CONDITIONS

- A. Do not apply materials to unprotected surfaces or when water is accumulated on surface.
- B. Do not apply materials when substrate and air temperature are lower than 50 degrees F or expected to fall below this temperature within 24 hours from time of application.
- C. Monitor working time or pot life of materials when substrate and air temperature are above 70 degrees F.
- D. Provide continuous ventilation and indirect air movement during application and curing of materials.

1.08 WARRANTY

- A. Provide manufacturer's standard 25 year warranty and provide applicator's standard applications warranty for quality of application.
 1. Spray-Lock Concrete Protection (SCP) will warrant installed systems against separating from the concrete substrate due to water migration or moisture vapor transmission through the concrete where SCP's application instructions or any other technical information stipulated in SCP's documentation are strictly followed.

1.09 COORDINATION

- A. Coordinate with concrete pour and pouring and allow enough time to install the vapor control system before installation of floor finish.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Spray-Applied Penetrating Colloidal Silica Concrete Treatment Performance: Concrete treated with SCP or approved equal, shall be capable of the following laboratory

performance when tested by qualified testing agency:

1. Penetration Depth: Determine penetration in the laboratory or in the field by extracting a core from treated concrete, cleaning the cored surface with water, and allowing the core to air dry for 24 hours. After air drying, a spray bottle or similar device shall be used to lightly spray water upon the cut surface of the core. After 3 to 7 minutes, the water on the untreated portion of the core will absorb into the concrete, leaving only the treated area with water on the surface. The average of five measurements of the depth of treated concrete from the original surface of the core shall serve as the depth of penetration measurement.
 2. Confirmed Chemical Reaction – Using scanning electron microscopy and/or gas chromatography, compare treated and untreated concrete to demonstrate a significant (greater than 5 percent) increase in C-S-H observed (in the case of SEM), or a significant (greater than 5 percent) increase in silica accompanied with a significant (greater than 5 percent) reduction in hydroxides.
 3. Reduction in Capillary Void Diameter/ Increased Tortuosity: Determine by one or more of the following methods:
 - a. AASHTO T-259 Resistance of Concrete to Chloride Ion Penetration: Treated concrete shall show at least a 50-percent reduction in chlorides at 1/2-inch depth after 90 days of ponding with a 3 percent NaCl solution when compared to a control.
 - b. NT Build 492 Chloride Migration Coefficient from Non-Steady-State Migration Experiments: Determine initial voltage by reading current magnitude through untreated sample. Use the same voltage for both the treated and untreated samples in order to assess the treatment effect. Treated samples shall demonstrate at least 20-percent reduction in chloride penetration depth.
 - c. EN 12390-8 Depth of Penetration of Water Under Pressure – Treated sample shall demonstrate at least 75-percent reduction of water penetration at 72 hours under 5 bar of pressure as compared to the control sample.
 4. Surface Residue Demonstrate no more than 5-percent reduction in skid resistance when tested according to ASTM E303 – Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester.
 5. Reduction in Drying Shrinkage Strain: Treated concrete shall demonstrate at least 30-percent reduction in drying shrinkage strain when tested according to ASTM C157 Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete as compared to an untreated control.
- B. Low-Emitting Materials:
1. General Emissions Evaluation: Building products shall be tested and determined compliant according to California Department of Public Health (CDPH) Standard Method v1.1–2010, using the applicable exposure scenario.
 2. Adhesives and sealants wet-applied on site shall meet applicable chemical-content requirements of SCAQMD Rule 1168, July 1, 2005, Adhesive and Sealant Applications, as analyzed by the methods specified in Rule 1168. Provisions of SCAQMD Rule 1168 do not apply to adhesives and sealants subject to state or federal consumer product VOC regulations.

2.02 PENETRATING COLLOIDAL SILICA CONCRETE TREATMENT FOR CONCRETE

- A. Source Limitations: Obtain vapor control floor products from single source manufacturer.
- B. Basis-of-Design Manufacturer: Subject to compliance with requirements, provide Spray-Lock Concrete Protection, LLC; SCP 327 or comparable products by one of the following:

1. Ardex Americas, MC Rapid.
2. Bostik Slabcote, Moisture Vapor Barrier Coating.
3. Koster VAP I 2000 System by Koster American Corporation.
4. MasterTop VB 240 FS by BASF.

2.03 ACCESSORIES

- A. Large Surface Areas and/or Volumes: Low-pressure, high-volume sprayer less than 100 psi (0.69 MPa), or medium-pressure airless sprayer less than 500 psi (3.4 MPa).
- B. Small to Medium Surface Areas and/or Volumes: Pump or backpack sprayer for areas under 1000 sq ft (9.3 sq m), or sprayers indicated for large surface areas above.
- C. Fill and Leveling Compounds: As recommended by material manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify concrete substrate has tensile strength of 200 psi minimum when tested in accordance with ASTM D4541 Method 5.
- B. Verify with substrate surface moisture requirement with each finish flooring material manufacturer. Coordinate with related Sections.
- C. Examine substrate surfaces with material manufacturer's representative to determine suitability to receive materials of this Section.
 1. Verify if concrete additives such as chlorides or other soluble compounds that can contaminate surfaces have been used in concrete mix. Notify material supplier.

3.02 PREPARATION

- A. Prior to applying materials clean and mechanically abrade surfaces to receive vapor control system. Provide concrete surfaces with minimum surface profile of ICRI CSP #3.
 1. Shot blast floors and clean surfaces to remove residue, dust, dirt, adhesives, leveling compounds, paint, floor hardeners, bond breakers, oil, grease, curing agents, form release agents, efflorescence, laitance, abrasive media, and other contamination or substance that will have a negative effect on material application or performance.
 2. Where preparation results in a surface profile that is CSP #6 or higher, use manufacturer's recommended filling or leveling product.
- B. Repair cracks, expansion joints, control joints. Fill open surface honeycombs and other surface imperfections according to vapor control system manufacturer's recommendations.
 1. Repair of Moving Joints: Repair expansion and isolation joints so joint movement capability is maintained throughout entire thickness of substrate.
 2. Saw Cuts, Control Joints and Non-moving Cracks: Fill non-moving joints and cracks greater than 1/32 inch with manufacturer recommended product. Allow to cure for a minimum of 16 hours prior to proceeding with Vapor Control System application.

- C. If concrete contains fiber reinforcing, remove fibers that extend beyond surface and vacuum. Remove fibers after mechanical abrading so no fibers remain on concrete surface. Provide uncontaminated, absorptive sound concrete surface.
- D. Adhesion tests: Verify proper adhesion of flooring adhesives, coatings, and leveling compounds to the final vapor reduction coating system for acceptability. Contact Manufacturer's Representatives for recommendations.
- E. Use clean containers and mix thoroughly per Manufacturer's written requirements to obtain a homogeneous mixture.

3.03 APPLICATION

- A. Apply materials in accordance with manufacturer's written instructions.
- B. For installation of resilient flooring directly over vapor control system, use 100 percent solids adhesives or contact type adhesives with long working times that can be applied to substrates with a maximum pH of 10. Apply contact type adhesives to substrate and allow water to evaporate prior to flooring installation. Test proper adhesion of adhesive to water vapor reduction system prior to installation of entire flooring systems.

3.04 CLEANING

- A. Clean tools and equipment immediately after use per manufacturer's recommendations.
- B. Remove debris from project site.

3.05 PROTECTION

- A. Protect applied material from rain or topical water for a minimum period of 24 hours from time of application.
- B. Protect each coat during specified cure period from traffic and contaminants.

3.06 KEYNOTE SCHEDULE

- A. Products in this Specification Section are cited in the Drawings as KEYNOTES. See PART 2 - PRODUCTS for further information on the following keynotes:

- | 1. | <u>KEYNOTE</u> | <u>DESCRIPTION</u> |
|----|----------------|----------------------------|
| a. | 096105.VC | VAPOR CONTROL FOR FLOORING |

END OF SECTION 09 61 05

This page intentionally left blank

SECTION 09 65 13 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Resilient base if needed to match existing.
 - 2. Resilient molding accessories.
- B. Related Sections:
 - 1. Division 02 Section "Selective Demolition" for salvage and reuse of existing rubber base.
 - 2. Division 09 Section "Wood Athletic Flooring" for vented base for use with wood flooring.
 - 3. Division 09 Section "Resilient Athletic Flooring" for resilient floor coverings in athletic-activity areas receiving resilient base.

1.02 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of product indicated.
- C. Samples for Verification: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches long, of each resilient product color, texture, and pattern required.
- D. Product Schedule: For resilient products. Use same designations indicated on Drawings.

1.03 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- B. Mockups: Provide resilient products with mockups specified in other Sections.

1.04 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 for more than 90 deg F.

1.05 PROJECT 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 time periods:
 - 1. 48 hours before installation.
 - 2. During installation.

3. 48 hours after installation.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.

1.06 EXTRA MATERIALS

- 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.

PART 2 - PRODUCTS

2.01 RESILIENT BASE

- A. Resilient Base:
 1. Manufacturers: Subject to compliance with requirements, provide Flexco resilient base or comparable products by one of the following:
 - a. Armstrong World Industries, Inc.
 - b. Mondo Rubber International, Inc.
 - c. Nora Rubber Flooring; Freudenberg Building Systems, Inc.
 - d. Roppe Corporation, USA.
- B. RB Resilient Base:
 1. Resilient base standard: ASTM F 1861.
 - a. Material Requirement: Type TS (rubber, vulcanized thermoset).
 - b. Manufacturing Method: Group I (solid, homogeneous).
 - c. Style: Cove (base with toe).
 2. Minimum Thickness: 0.125 inch.
 3. Height: 4 inches or as otherwise indicated on Drawings.
 4. Lengths: Coils in manufacturer's standard length.
 5. Outside Corners: Job formed.
 6. Inside Corners: Job formed.
 7. Finish: Matte.
 8. Colors: As noted in Finish Schedule on Drawings.

2.02 RESILIENT MOLDING ACCESSORY

- A. Resilient Molding Accessory:
 1. Manufacturers: Subject to compliance with requirements, provide products by Flexco or products from one of the following:
 - a. Armstrong World Industries, Inc.
 - b. Tarkett.
 - c. Nora Rubber Flooring; Freudenberg Building Systems, Inc.
 - d. Roppe Corporation, USA.
- B. Description: Cap for cove; resilient floor covering; carpet bar for tackless installations; carpet edge for glue-down applications; nosing for resilient floor covering; reducer strip for resilient floor covering; and transition strips.

- C. Material: Rubber.
- D. Profile and Dimensions: As indicated.
- E. Colors and Patterns: As indicated on Drawings in Finish Schedule.

2.03 INSTALLATION MATERIALS

- A. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
 - 1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a. Cove Base Adhesives: Not more than 50 g/L.
 - b. Rubber Floor Adhesives: Not more than 60 g/L.
- B. Metal Edge Strips: Extruded aluminum with mill finish, nominal 2 inches (50.8 mm) wide, of height required to protect exposed edges of flooring, and in maximum available lengths to minimize running joints.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. 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.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 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 and remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until they are same temperature as the space where they are to be installed.
 - 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- D. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.03 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 practicable without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Job-Formed Corners:
 - 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 24 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 24 inches in length.
 - a. Miter or cope corners to minimize open joints.
- H. See Division 10 Section "Wall and Door Protection" for corner guard mounting height placement requirements.

3.04 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 carpet and resilient floor covering that would otherwise be exposed.

3.05 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Perform the following operations immediately after completing resilient product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop 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.

3.06 KEYNOTE SCHEDULE

- A. Products in this Specification Section are cited in the Drawings as KEYNOTES. See PART 2 - PRODUCTS for further information on the following keynotes:
 - 1.

<u>KEYNOTE</u>	<u>DESCRIPTION</u>
a. 096513.RB	RESILIENT BASE

END OF SECTION 09 65 13

SECTION 09 68 00 - CARPETING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Modular carpet tile.
- B. Related Sections:
 - 1. Division 09 Section "Vapor Control for Flooring" for fluid applied concrete floor sealer for control of moisture vapor transmission and alkalinity where carpet will be installed.
 - 2. Division 09 Section "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet.
 - 3. Division 12 Section "Entrance Mats" for carpet entrance mats.

1.02 SUBMITTALS

- A. Product Data: For the following, including installation recommendations for each type of substrate:
 - 1. Carpet: For each type indicated. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
- B. Shop Drawings: Show 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. Type, color, and location of insets and borders.
 - 10. Type, color, and location of edge, transition, and other accessory strips.
 - 11. Transition details to other flooring materials.
- C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
 - 1. Carpet Tile: Full-size Sample.
- D. Product Data: In addition to complete data on each carpet and carpeting material, provide manufacturer's certification or certified test laboratory reports for required compliance with specified tests. Provide written instructions for each type of installation required.
- E. Product Schedule: For carpet use same designations indicated on Drawings.
- F. Qualification Data: For Installer.

- G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency.
- H. Maintenance Data: For carpet to include in maintenance manuals. Include the following:
 - 1. Methods for maintaining carpet, 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.
- I. Warranties: Special warranties specified in this Section.

1.03 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the Floor Covering Installation Board or who can demonstrate compliance with its certification program requirements.
 - 1. Firm with not less than 5 years of carpeting experience, similar to work of this Section, and certified by manufacturer.
 - 2. An experienced installer who is certified by the International Certified Floor Covering Installers Association at the Commercial II certification level.
- B. Standard: Comply with applicable non-conflicting provisions of following:
 - 1. CRI 104, Standard for Installations of Textile Floor covering Materials
 - 2. FCIB, Installation Contractor Certification.
 - 3. IFCI, Installer Certification.
- C. Fire-Test-Response Characteristics: Provide products with the critical radiant flux classification indicated in Part 2, as determined by testing identical products per ASTM E 648 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to carpet installation including, but not limited to, the following:
 - 1. Review delivery, storage, and handling procedures.
 - 2. Review ambient conditions and ventilation procedures.
 - 3. Review floor prep required per Division 09 Section "Vapor Control for Flooring."

1.04 DELIVERY, STORAGE, AND HANDLING

- A. General: Deliver carpeting materials in protective wrapping and store inside, protected from weather, moisture, and soiling.
- B. Comply with CRI 104, Section 5, "Storage and Handling."

1.05 PROJECT CONDITIONS

- A. Comply with CRI 104, Section 7.2, "Site Conditions; Temperature and Humidity" and Section 7.12, "Ventilation."
- B. Environmental Limitations: Do not install carpet until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

- C. Do not install carpet over concrete slabs until slabs have cured, are sufficiently dry to bond with adhesive, and have pH range recommended by carpet manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet, install carpet before installing these items.

1.06 WARRANTY

- A. Special Warranty for Carpet and carpet cushion: Manufacturer's standard form in which manufacturer agrees to repair or replace components of carpet installation that fail in materials or workmanship within specified warranty period.
- B. Warranty does not include deterioration or failure of carpet due to unusual traffic, failure of substrate, vandalism, or abuse.
 - 1. Failures include, but are not limited to, more than 15 percent loss of face fiber, edge raveling, snags, runs, loss of tuft bind strength, excess static discharge, Watermarking, i.e., permanent pile reveal excluding "shading" or "tracking" which is defined as a gradual change in appearance from edge to middle caused by repeated traffic, and often referred to as traffic lanes, and delamination.
 - 2. Warranty Period: 15 years from date of Substantial Completion.
- C. Special Warranty: In addition to manufacturer's warranty, subcontractor shall guarantee installation against stretching, wrinkling, opening of seams, or other areas of improper workmanship for period of 2 years. If defects are found in carpet resultant from improper installation, subcontractor agrees to repair or replace defective area at his expense.

1.07 EXTRA MATERIALS

- A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Provide one full width roll no less than 10 ft of each type.

PART 2 - PRODUCTS

2.01 CARPET TILE

- A. Carpet Tile.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Interface; Natures Course Style #128990AK00, or a comparable product by one of the following:
 - a. J&J Flooring Group LLC.
 - b. Milliken & Company.
 - c. Mohawk Carpet, LLC; The Mohawk Group.
 - d. Tarkett
 - 2. Color and pattern: As indicated on Drawings in Finish Schedule.
 - 3. Installation: Ashlar.
 - 4. Fiber Content: 100% Recycled content nylon.
 - 5. Fiber Type: Aquafil (Protekt² Stain resist).
 - 6. Pile Characteristic: Engaged tufted pattern loop.
 - 7. Pile Density: 7,448 oz/yd³.
 - 8. Total Thickness: 0.09 inch (2.20 mm).

9. Stitches/Rows per Inch: 8.50 inch (10 cm)
10. Gage: 1/10 inch.
11. Primary Backing: GlasBac
12. Secondary Backing: ethos® Modular with Omnicoat Technology™.
13. Size: 9.845 by 39.39 inches (25 cm by 1 m).

2.02 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and is recommended or provided by carpet and carpet cushion manufacturers.
- C. Seam Adhesive: Chemical seaming adhesive or similar product recommended by carpet manufacturer for sealing and taping seams and buttering cut edges at backing to form secure seams and to prevent pile loss at seams. Each seam must be sealed on both edges.
- D. 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

3.01 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 performance.
- B. Examine carpet for type, color, pattern, and potential defects.
- C. Concrete Slabs: Verify that finishes comply with requirements specified in Division 03 Section "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.
 1. Recommended Moisture Testing at Owner's Expense: Perform tests so that each test area does not exceed 1000 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 manufacturers. Proceed with installation only after substrates pass testing.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. General: Comply with CRI 104, Section 7.3, "Site Conditions; Floor Preparation," and with carpet manufacturer's written installation instructions for preparing substrates.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch, unless more stringent requirements are required by manufacturer's written instructions.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet manufacturer.
- D. Existing Concrete Slab: Pre-existing adhesives and curing agent will affect the moisture emission rate. Consult manufacturer's recommendations for installation over existing concrete surfaces.
- E. Multiple layers of pre-existing adhesive must be removed or covered with latex based Portland cement or sealed with an approved adhesive sealer. Use one of the two following methods:
 - 1. Leveling Compounds: Mechanically remove existing concrete curing agents. Skim coat with a Portland based leveling compound.
 - 2. Approved Adhesive Sealer: Scrape adhesive flat and encapsulate with XL Brands TriSeal (800-367-4583) or equivalent.
- F. Broom and vacuum clean substrates to be covered immediately before installing carpet.

3.03 INSTALLATION

- 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 performance. Examine carpet for type, color, pattern, and potential defects.
 - 1. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Comply with CRI 104 and carpet manufacturer's written installation instructions for the following:
 - 1. Carpet with Attached-Cushion Installation: Comply with CRI 104, Section 11, "Attached-Cushion Installations."
- C. Comply with carpet manufacturer's written recommendations 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.
- D. Level adjoining border edges.
- E. Maintain dye-lot integrity. Do not mix dye lots in same area.
- F. Maintain pile-direction patterns.
- G. Do not bridge building expansion joints with carpet.
- H. 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.

- I. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- J. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use non-permanent, nonstaining marking device.
- K. Install pattern parallel to walls and borders to comply with CRI 104, Section 15, "Patterned Carpet Installations" and with carpet manufacturer's written recommendations.
- L. Comply with carpet cushion manufacturer's written recommendations.

3.04 CLEANING AND PROTECTING

- A. Perform the following operations immediately after installing carpet:
 - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet 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 CRI 104, Section 16, "Protection of Indoor Installations." Have installer advise Contractor of protection methods and materials needed to ensure that carpeting will be without deterioration or damage at time of Substantial Completion.
- C. Protect carpet 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.

3.05 KEYNOTE SCHEDULE

- A. Products in this Specification Section are cited in the Drawings as KEYNOTES. See PART 2 - PRODUCTS for further information on the following keynotes:
 - 1.

<u>KEYNOTE</u>	<u>DESCRIPTION</u>
a. 096800.CPT	CARPET

END OF SECTION 09 68 00

SECTION 09 91 23 - INTERIOR PAINTING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Surface preparation and the application of paint systems on the following interior substrates:
 - a. Steel.
 - b. Hollow metal frames.
 - c. Wood.
 - d. Gypsum board.
- B. Related Sections:
 - 1. Division 08 Sections for factory priming hollow metal doors and frames with primers specified in this Section.
 - 2. Division 09 Section "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on interior wood substrates.

1.02 DEFINITIONS

- A. Gloss Levels:
 - 1. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
 - 2. 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. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
 - 4. 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. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
 - 6. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
 - 7. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Initial Selection: For each type of topcoat product.
- C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8 inches square.
 - 2. Label each coat of each Sample.
 - 3. Label each Sample for location and application area.
- D. Product List: For each product indicated, include the following:
 - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.

- E. Shop Drawings: For painted letters.
 - 1. Show painted letter locations and heights.
 - 2. Show typesyles and layout for each sign at least quarter size.

1.04 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
 - 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.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Handling: Deliver products to Project site in an undamaged condition in manufacturer's original sealed containers, complete with labels and instructions for handling, storing, unpacking, protecting, and installing. Packaging shall bear the manufacturer's label with the following information:
 - 1. Product name and type (description).
 - 2. Batch date.
 - 3. Color number.
 - 4. VOC content.
 - 5. Environmental handling requirements.
 - 6. Surface preparation requirements.
 - 7. Application instructions.
- 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.

1.06 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.

1.07 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: Coordinate with Deschutes County regarding quantity of each material and color applied.

1.08 CLOSEOUT SUBMITTALS

- A. Coating Maintenance Manual: Provide coating maintenance manual including area summary with finish schedule, area detail designating location where each product/color/finish was used, product data pages, material safety data sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design Products: Subject to compliance with requirements, provide Benjamin Moore, or comparable products by one of the following:
 1. Kelly-Moore Paints.
 2. Miller Paint Company.
 3. PPG Paints.
 4. Rodda Paint Co.
 5. Rust-Oleum Corporation.
 6. Sherwin-Williams Company (The).
- B. Comparable Products: Comparable products of approved manufacturers will be considered in accordance with Division 01 Section "Product Requirements," and the following:
 1. Products are approved by manufacturer in writing for application specified.
 2. Products meet performance, specified properties and physical characteristics of basis of design product including published ratio of solids by volume, plus or minus two percent.
- C. Source Limitations: Obtain paint materials from single source from single listed manufacturer.
 1. Manufacturer's designations listed on a separate color schedule are for color reference only and do not indicate prior approval.

2.02 PAINT, GENERAL

- A. VOC Content: For field applications that are inside the weatherproofing system, paints and coatings shall provide materials that comply with VOC limits of authorities having jurisdiction and for interior paints and coatings applied at Project site, the following VOC limits exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 1. Flat Paints and Coatings: 50 g/L.
 2. Nonflat Paints and Coatings: 150 g/L.
 3. Primers, Sealers, and Undercoaters: 200 g/L.
 4. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
- 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 manufacturers of topcoat for use in paint system and on substrate indicated.
- C. Colors: Refer to Material Finish Schedule on Drawings.
 1. If not indicated on Finish Schedule, provide colors selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.01 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. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers. Where acceptability of substrate conditions is in question, apply samples and perform in-situ testing to verify compatibility, adhesion, and film integrity of new paint application.
 1. Report, in writing, conditions that may affect application, appearance, or performance of paint.
- B. Substrate Conditions:
 1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - a. Wood: 15 percent.
 - b. Gypsum Board: 12 percent.
 2. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- C. Proceed with coating application only after unsatisfactory conditions have been corrected; application of coating indicates acceptance of surfaces and conditions.
 1. Application of coating indicates acceptance of surfaces and conditions.

3.02 PREPARATION

- A. Comply with manufacturer's written instructions, applicable to substrates 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.
 2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- 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. 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.

- E. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

3.03 APPLICATION

- A. Apply paints according to manufacturer's written instructions.
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
 - 6. Apply paints and primers to achieve the recommended wet and dry film thickness published on the manufacture's Product Data Sheets.
- B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- C. 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.

3.04 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.
 - 3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.
- B. Painted interior surfaces shall be considered to lack uniformity and soundness if any of the following defects are found by the Architect:
 - 1. Brush/roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped or missed areas, and foreign materials in paint coatings.
 - 2. Evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners and re-entrant angles.
 - 3. Damage due to touching before paint is sufficiently dry or any other contributory cause.
 - 4. Damage due to application on moist surfaces or caused by inadequate protection from the weather.

5. Damage and/or contamination of paint due to blown contaminants (dust, spray paint, and similar contaminants).
- C. Painted surfaces shall be considered unacceptable if any of the following are evident under natural lighting source for exterior surfaces and final lighting source (including daylight) for interior surfaces:
1. Visible defects are evident on vertical surfaces when viewed at normal viewing angles from a distance of not less than 39 inches.
 2. Visible defects are evident on horizontal surfaces when viewed at normal viewing angles from a distance of not less than 39 inches.
 3. Visible defects are evident on ceiling, soffit and other overhead surfaces when viewed at normal viewing angles.
 4. When the final coat on any surface exhibits a lack of uniformity of color, sheen, texture, and hiding across full surface area.
- D. Painted surfaces rejected by the inspector or Architect shall be made good at the expense of the Contractor. Small affected areas may be touched up; large affected areas or areas without sufficient dry film thickness of paint shall be repainted. Runs, sags of damaged paint shall be removed by scraper or by sanding prior to application of paint.

3.05 CLEANING AND PROTECTION

- A. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- B. 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.
- C. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.06 INTERIOR PAINTING SCHEDULE

- A. Wood Substrates: Including exposed wood items not indicated to receive shop-applied finish. Refer to individual Division 06 and 12 woodwork Sections for shop-applied finishes.
 1. Latex System for Light Duty, Low Contact Areas:
 - a. Prime Coat: Primer sealer, latex, interior:
 - 1) S-W PrepRite ProBlock Primer Sealer, B51-620 Series, at 4.0 mils wet, 1.4 mils dry.
 - b. Intermediate Coat: Latex, interior, matching topcoat.
 - c. Topcoat: Best Commercial Grade Latex, interior, eggshell:
 - 1) S-W ProMar 200 Zero VOC Latex Eg-Shel, B20-2600 Series, at 4.0 mils wet, 1.7 mils dry, per coat.
 2. Water-Based Light Industrial Coating System for Medium Duty, Medium Contact Areas:
 - a. Prime Coat: Primer sealer, latex, interior:
 - 1) S-W PrepRite ProBlock Primer Sealer, B51-620 Series, at 4.0 mils wet, 1.4 mils dry.

- b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
 - c. Topcoat: Light industrial Single Component Urethane or Epoxy Modified Latex, interior, water based, matte.
 - 3. Heavy Duty, High Contact Areas - Waterbased/Single Component Urethane System: Including MDF paneling, MDF wainscot and related trim.
 - a. Shop Prime Coat: Pre-prime in shop with one of the following oil, solvent based, primer/sealers:
 - 1) S-W Extreme Block Interior/Exterior Stain Blocking Alkyd Primer, B49W00600.
 - 2) S-W ProBlock Interior Oil-Based Primer, B79W08810.
 - b. Intermediate Coat: Water-based Single Component Urethane, matching topcoat.
 - c. Topcoat: Water-based Single Component Urethane, semi-gloss:
 - 1) S-W Pro Industrial Waterbased Alkyd Urethane, Semi-Gloss, B53-0115 Series, at 4.0 to 5.0 mils wet, 1.4 to 1.7 mils dry, per coat.
- B. Gypsum Board Substrates:
 - 1. Latex System:
 - a. Prime Coat: Primer, latex, interior:
 - 1) S-W ProMar 200 Zero VOC Latex Primer, B28W2600, at 4.0 mils wet, 1.0 mils dry.
 - b. Intermediate Coat: Latex, interior, matching topcoat.
 - c. Topcoat: Best Commercial Grade Latex, interior, flat:
 - 1) S-W ProMar 200 Zero VOC Latex Flat, B30-2600 Series, at 4.0 mils wet, 1.6 mils dry, per coat.
 - d. Topcoat: Best Commercial Grade Latex, interior, eggshell:
 - 1) S-W ProMar 200 Zero VOC Latex Eg-Shel, B20-2600 Series, at 4.0 mils wet, 1.7 mils dry, per coat.
 - e. Topcoat: Best Commercial Grade Latex, interior, semi-gloss:
 - 1) S-W ProMar 200 Zero VOC Latex Semi-Gloss, B31-2600 Series, at 4.0 mils wet, 1.6 mils dry, per coat.
 - 2. Water-Based Light Industrial Epoxy Coating System: Provide Rust-Oleum 5300 System Water-Based Epoxy or comparable system by Sherwin-Williams as follows:
 - a. Prime Coat: Primer sealer, latex, interior:
 - 1) S-W ProMar 200 Zero VOC Latex Primer, B28W2600, at 4.0 mils wet, 1.0 mils dry.
 - b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
 - c. Topcoat: Light industrial Epoxy Modified Acrylic coating, interior, water based, semi-gloss:
 - 1) S-W Pro Industrial Pre-Catalyzed Waterbased Epoxy, K46-151 Series, at 4.0 mils wet, 1.5 mils dry, per coat.

3.07 KEYNOTE SCHEDULE

- A. Products in this Specification Section are cited in the Drawings as KEYNOTES. See PART 2 - PRODUCTS for information on the following keynotes:
 - 1.

KEYNOTE	DESCRIPTION
a. 099123.PT	PAINT SYSTEM

END OF SECTION 09 91 23

This page intentionally left blank

SECTION 09 93 00 - STAINING AND TRANSPARENT FINISHING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Surface preparation and application of wood finishes on the following substrates:
 - a. Interior Substrates:
 - 1) Standing and running trim with transparent finish.
- B. Related Sections:
 - 1. Division 06 Section "Interior Finish Carpentry."
 - 2. Division 09 Section "Interior Painting" for surface preparation and application of standard paint systems on interior substrates.

1.02 DEFINITIONS

- A. Paint gloss shall be defined in accordance with the following MPI values (per ASTM D 523 - Standard Test Method for Specular Gloss):
 - 1. Gloss Level G1, Matte or Flat finish, Units @ 60 degrees 0 to 5, Units @ 85 degrees 10 max.
 - 2. Gloss Level G2, Velvet finish, Units @ 60 degrees 0 to 10, Units @ 85 degrees 10 to 35.
 - 3. Gloss Level G3, Eggshell finish, Units @ 60 degrees 10 to 25, Units @ 85 degrees 10 to 35.
 - 4. Gloss Level G4, Satin finish, Units @ 60 degrees 20 to 35, Units @ 85 degrees 35 min.
 - 5. Gloss Level G5, Semi-Gloss finish, Units @ 60 degrees 35 to 70.
 - 6. Gloss Level G6, Gloss finish, Units @ 60 degrees 70 to 85.
 - 7. Gloss Level G7, High-Gloss finish, Units @ 60 degrees > 85

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include preparation requirements and application instructions.
- B. Samples: For each type of finish system and in each color and gloss of finish indicated.
- C. Product List: For each product indicated, include printout of current "MPI Approved Products List" for each product category specified in Part 2, with the product proposed for use highlighted.

1.04 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: 1 percent, but not less than 1 quart of each material and color applied.

1.05 QUALITY ASSURANCE

- A. MPI Standards: MPI reference system numbers are used to describe systems required, and VOC limits are specified for IAQ (Indoor Air Quality) compliance.
 - 1. Products: Complying with MPI standards indicated and listed in its "MPI Approved Products List." MPI listed products are used as a guide to specifying systems, however not every product available is tested, therefore, if a product is used which is not listed by MPI, the responsibility is the bidders' to verify and obtain approval from the Architect for products not listed.
 - 2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and finish systems indicated.
- B. Mockups: Apply mockups of each finish system indicated and each color 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 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.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Benjamin Moore.
 - 2. Glidden Professional (formally ICI Paints).
 - 3. Kelly-Moore Paints.
 - 4. Parker Paint Mfg. Co. Inc.
 - 5. PPG Architectural Finishes, Inc.
 - 6. Rodda Paint Co.
 - 7. Sherwin-Williams Company (The).
- B. Substitutions: Prior to bid only, see Division 01 Section "Substitution Request Form During Bid."

2.02 MATERIALS, GENERAL

- A. Material Compatibility:
 - 1. Provide materials for use within each finish 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 finish system, provide products recommended in writing by manufacturers of topcoat for use in finish system and on substrate indicated.
- B. Stain Colors: Match Architect's samples.
 - 1. Architect shall select stain tint and clear finishes for application to various wood finish products as work of this section. Coordinate the finish selection with

Division 06 products.

a. Refer to Finish Schedule on Drawings.

PART 3 EXECUTION

3.01 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.

3.02 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 particular 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.

3.03 APPLICATION

- A. Apply finishes according to manufacturer's written instructions and recommendations in "MPI Manual."
- B. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

3.04 CLEANING AND PROTECTION

- A. 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.

- B. At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

3.05 EXTERIOR WOOD-FINISH-SYSTEM SCHEDULE

- A. General: All scheduled systems shall be Premium Grade as defined by the "MPI Manual"
- B. Wood substrates, nontraffic surfaces, including exposed joists exposed beams.
 - 1. Solid Hide, Water-Based Stain System: MPI EXT 6.2B
 - a. Prime Coat: Primer, oil for exterior wood, MPI #7.
 - b. Intermediate Coat: Stain, exterior, water based, solid hide, matching topcoat.
 - c. Topcoat: Stain, exterior, water based, solid hide, MPI #16. Satin Gloss Level.
- C. Exposed Rough Carpentry Substrates:
 - 1. Solid-Color, Solvent-Based Stain System: MPI EXT 6.2D.
 - a. Prime Coat: Exterior alkyd wood primer.
 - b. Two Stain Coats: Exterior solid-color stain (solvent based). Satin Gloss Level.
 - 2. Varnish Over Semitransparent Stain System: MPI EXT 6.2E.
 - a. Stain Coat: Exterior semitransparent stain (solvent based).
 - 3. Three Finish Coats: Exterior marine spar varnish (Satin Gloss Level.) .
- D. Wood substrates, nontraffic surfaces, including wood trim wood-based panel products.
 - 1. Varnish over Semitransparent Stain System: MPI EXT 6.4J
 - a. Stain Coat: Stain, exterior, solvent based, semi-transparent, MPI #13.
 - b. First Intermediate Coat: Varnish matching topcoat.
 - c. Second Intermediate Coat: Varnish matching topcoat.
 - d. Topcoat: Exterior marine spar varnish (Satin Gloss Level).

3.06 INTERIOR WOOD-FINISH-SYSTEM SCHEDULE

- A. General: All scheduled systems shall be Premium Grade as defined by the "MPI Manual"
- 1. Moisture-Cured Clear Polyurethane Over Stain System: MPI INT 6.1S.
 - a. Stain Coat: Interior wood stain (semitransparent).
 - b. Three Finish Coats: Moisture-cured clear polyurethane -satin.
- B. Wood substrates, nontraffic surfaces, including wood trim architectural woodwork wood-based panel products.
 - 1. Moisture-Cured Clear Polyurethane Over Stain System: MPI INT 6.3Y.
 - a. Stain Coat: Interior wood stain (semitransparent).
 - b. Three Finish Coats: Moisture-cured clear polyurethane- satin.
- C. Exposed Wood Panel-Product Substrates:
 - 1. Moisture-Cured Clear Polyurethane over Stain System: MPI INT 6.4V.
 - a. Stain Coat: Interior wood stain (semitransparent).
 - b. Three Finish Coats: Moisture-cured clear polyurethane -satin.

3.07 KEYNOTE SCHEDULE

- A. Products in this Specification Section are cited in the Drawings as KEYNOTES. See PART 2 - PRODUCTS for information on the following keynotes:

- | 1. | <u>KEYNOTE</u> | <u>DESCRIPTION</u> |
|----|----------------|-------------------------|
| a. | 099300.TWF | TRANSPARENT WOOD FINISH |

END OF SECTION 09 93 00

This page intentionally left blank

SECTION 10 14 00 - INTERIOR SIGNAGE

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Interior Building Signage.
 - 2. Primary Room ID (Sign Panel).
 - 3. Secondary Room ID - Specialized Use (Sign Panel).
 - 4. Restroom ID (Sign Panel).
 - 5. Maximum Occupancy (Sign Panel).
 - 6. Exit Instructional (Sign Panel).
 - 7. Evacuation Map (Sign Panel).

1.02 SCOPE OF WORK

- A. Field verify site conditions and dimensions affecting signage installation and coordinate with signage design and installation.
- B. Provide final design for signage based on the schematic level signage design shown in the Contract Documents.
- C. Provide signage shop drawings showing the final design for each sign type required for the project.

1.03 REFERENCES

- A. References shall be the latest adopted edition.
- B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- C. IBC – International Building Code.
- D. ICC / ANSI A117.1 - Accessible and Usable Buildings and Facilities.
- E. Oregon Structural Specialty Code (OSSC), Chapter 11, Accessibility.

1.04 SUBMITTALS

- A. Refer to Division 01 Section "Submittal Procedures" for submittal procedures.
- B. Product Data: Submit manufacturer's technical data for each type of sign or manufactured component required.
- C. Shop Drawings: Indicate size, thickness and finishes for each sign type; include methods of attachment for each different substrate and sign type. Provide details and sections at full size. Proposed deviations from the Contract Drawings shall be clearly identified.
 - 1. Installer to submit CAD generated location plan noting the location of each sign and cross referenced to sign type schedule.

2. Copy Layout: Provide scaled drawings showing copy layout for each sign type. Show exact letter, number, symbols, arrows, letter / word / line size, spacing, margins, braille, etc. positioned within the sign face outline. Copy layouts will be adjusted during Architect's review when required to conform to the design intent; revise and resubmit for final approval.
3. Text Information Supplied By Owner: Allow 60 days for Owner verification of signage text and room numbering during submittal process.
4. Sign Samples: Submit two (2) different sign types for verification of materials, colors, graphics / pattern, typography, braille, method of attachment including fasteners if applicable, overall workmanship quality and conformance to Contract Drawing and Specification requirements. One sign type must show paper insert window. Acceptable samples will be retained on file as the standard of quality for the signage.
5. Color Samples: Provide three (3) samples (3" x 5" minimum size), of each different color and texture required; samples shall be the actual materials used in signage and not photographic facsimiles.
6. Operations And Maintenance Data: Submit operation and maintenance instructions for signage components.
 - a. Provide cleaning instructions for each different surface / finish exposed to view on signage.
 - b. Provide a comprehensive Signage Manual in both a paper and PDF format. The Manual shall include shop drawings, signage location plan, signage type and copy schedule, computer graphics files, paper insert templates, mounting details and signage reorder information.
 - 1) Include listing of product and color selections (manufacturer product and color number) for each different finish and color applied on signage.

1.05 QUALITY ASSURANCE

- A. Signage Fabricator Qualifications: Not less than 5 years of successful experience in fabrication and installation of signage similar in type and scope to those required for this project, with record of successful fabrication and installation and sufficient capacity to produce and install the required signage within the project schedule.
 1. Obtain signs from one source and a single fabricator.
 2. The signage fabricator shall have broad in-house knowledge, diverse shop and field experience, flexibility, coordination ability, skilled craftsmen and a physical plant necessary to produce quality products equivalent to or superior to similar type products produced by other signage fabricators in the same area of expertise.
 3. Installers shall be employees of fabricator, trained and experienced in signage installation using best workmanship.
 4. Upon request, provide list of at least five (5) recently completed projects along with names and contact information for project Owner and Architect
 5. Workmanship / Quality: Signage fabrications shall employ the best fabrication practices common to the signage industry and to the highest standards of workmanship. Fabrications shall be free of imperfections in material and workmanship and suitable for its intended use and location.

1.06 FIELD CONDITIONS

- A. Conduct inspection of conditions on project site and review of signage locations.
- B. For signage that must fit closely within an existing condition or architectural detail, field measure and adjust sign to fit in the space.

- C. Field verify / measure dimensions and review site conditions prior to submitting shop drawings and starting fabrication.
- D. Coordinate signage work with Contract Drawings, change directives and as-built conditions.

1.07 DELIVERY, STORAGE & HANDLING

- A. Package signage for protection during shipping, storage and installation.
- B. Products should remain in original packaging until installation. Store products in a dry, indoor location.

1.08 PRE-INSTALLATION CONFERENCE

- A. Prior to beginning signage installation work, convene a conference to review installation procedures and concerns, work schedule and sequencing / coordination with other work.
 - 1. The following persons shall attend Conference: Contractor, Signage Installer, Architect, and Owner.

1.09 WARRANTY

- A. Provide one (1) year warranty covering the following:
 - 1. Signage shall be warranted against defects in materials and workmanship. Promptly correct at no expense to the Owner any defective signage resulting from defective or inferior materials or workmanship.
 - 2. Defective materials and workmanship include, but are not limited to, the following: Delaminating of sign parts or finishes, cupping, warping or dishing of surfaces, bubbling, crazing, chalking, or fading of finishes, rusting or corrosion of parts, installations that are not plumb or securely fastened, use of incorrect finishes or materials, or unapproved deviations from the Contract Documents or approved shop drawings.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. ADA Accessible Signage shall comply with to ICC / ANSI A117.1 Chapter 7 and Oregon Structural Specialty Code, Chapter 11, Accessibility. Signage shall comply with IBC, Chapters 9, 10 and 11 including color requirements.
 - 1. Character Proportion: Letters and numbers on signs shall have a width-to- height ratio between 3:5 and 1:1 and a stroke width-to-height ratio between 1:5 and 1:10.
 - 2. Color Contrast: Characters and symbols shall contrast with their background – either light characters on a dark background or dark characters on a light background.
 - 3. Raised Characters / Symbols: Letters, numbers and symbols shall be raised 1/32 inch minimum; letters and numbers shall be sans serif characters and have a height between 5/8 inch and 2 inches.
 - 4. Braille: Grade 2 with accompanying raised text.

2.02 FABRICATORS

- A. Interior Signage Fabricators: The following fabricators are acceptable for providing signage for this project:
1. Industry Graphics, Auburn, WA.
 2. Sign Solutions, Greenwood, IN.
 3. Doty Signs, Kirkland, WA.
 4. Sign Dog Media, Puyallup, WA.

2.03 MATERIALS

- A. Aluminum: Conform to ASTM B209, 5000 series, 6061-T6 and 6063 alloys selected for best performance for each sign application.
1. Materials provided shall be free of surface blemishes such as pitting, roller marks, rolled trade names and surface roughness.
 2. Acrylic Sheet: Clear, plexiglass extruded acrylic sheet, non-glare surface.
 - a. Manufacturers / Products:
 - 1) Acrylite FF.
 - 2) Lucite CP.
 - 3) Optix.
 3. Photopolymer Sheet:
 - a. Manufacturer / Product: Nova Polymers NovAcryl PT Series is the basis of design and the standard of quality, function and appearance required for this project.
 - b. Photopolymer Sheet: 0.032 inch thick moisture resistant, non-glare interior nylon photopolymer bonded to ultraviolet resistant, clear PETG (polyethylene terephthalate glycol-modified) sign base, single piece construction. Flame spread / smoke developed rating less than 75/120, tested to ASTM E84 and UL 723
 4. Hot Stamping Foil: Heat activated color pigmented foil for hot stamping color onto photopolymer sheet; use foil recommended by photopolymer sheet manufacturer for compatibility. Manufacturer / Product: Nova Polymers Hot Stamping Foils.
 5. Cut Metal Letters: Computer controlled precision machine cut using waterjet cutting equipment for uniform appearance and cut finish.
 - a. Use the exact typefaces specified; verify prior to production if there is any question about the identity of a specified typeface.
 - b. Cut edges shall be smooth and free of tool or cutting marks.
 - c. Edges shall be slightly eased to eliminate sharpness.
 - d. Install 300 Series stainless steel threaded pins in backside of each letter for secure, theft-proof attachment.
 6. Paint: Provide paint manufactured specifically for signage painting with excellent color and gloss retention and surface hardness. Use the same manufacturer for each coat specified for a given system.
 - a. Manufacturers: Matthews Paint is the basis of design and the standard of quality, function and appearance required for this project. The following manufacturers are acceptable provided they can provide products that are equal to or exceed the products provided by Matthews Paint.
 - 1) Matthews Paint (basis of design).
 - 2) Sherwin Williams Genesis.
 - 3) AkzoNoble.
 - b. Low Emitting Interior Finishes – Paints And Coatings: Paint applied during construction inside the building envelope shall meet Green Seal GS-11 Standard.
 - c. Schedule – Paint Systems: Provide the following paint system for each different material:
 - 1) Aluminum:

- (a) Pretreatment Cleaner: Clean surface with Matthews 45 330SP Speed Prep Cleaner.
- (b) Prime Coat: Matthews 274 808SP / 274 909SP Black Epoxy Primer, or 274 908SP / 274 909SP White Epoxy Primer applied at 1.5 – 2.0 mils DFT.
- (c) Top Coats: 2 coats of Matthews MPC 100 Acrylic Polyurethane (MAP) applied at 2 mils DFT.
- (d) Clear Coats: 2 coats of Matthews MAP Clear applied at 2.0 mils DFT, gloss as selected by Architect.
- (e) Application: Spray.
- 2) Gloss: As selected by Architect.
- 3) Acrylic, PETG And PVC:
 - (a) Surface Preparation / Cleaning: As recommended by paint manufacturer.
 - (b) Prime Coat: Matthews 74 777SP Tie Bond Adhesive
 - (c) applied at 1.5 – 2.0 mils DFT.
 - (d) Top Coats: 2 coats of Matthews MPC 100 Acrylic Polyurethane (MAP) applied at 2 mils DFT.
 - (e) Clear Coats: 2 coats of Matthews MAP Clear applied at 2.0 mils DFT, gloss as selected by Architect.
 - (f) Application: Spray.
- 4) Gloss: As selected by Architect.
- 7. Vinyl Film: Premium quality, 2.0 mil, cast vinyl, opaque with high performance, permanent, clear pressure-sensitive acrylic adhesive.
 - a. Manufacturers / Products:
 - 1) Avery Dennison SC 900 Super Cast Series.
 - 2) Oracal 951.
 - 3) 3M Company Scotchcal Series 7125.
- 8. Double-Side Adhesive Tape: 3M Company VHB Tape.

2.04 FABRICATION – GENERAL

- A. Field verify dimensions and conditions on site prior to fabrication and confirm that proposed size and configuration for signage and graphics will fit the space and not conflict with other elements.
- B. General: Fabricate interior signs from new materials using the best fabrication procedures, practices and workmanship that is common to the signage industry.
- C. Metal Fabrications: Fabrication shall be smooth, free from abrasion, burrs, sharp edges, tool marks, visible welds, exposed fasteners, or similar defects. Corners, reveals, and joints shall be accurately milled to match adjoining pieces and shall be fabricated so that they are straight and / or configured to match the approved shop drawings.
 - 1. Joints and seams shall be minimized by using the largest sheet size reasonably available.
 - 2. Welds: External welds are to be continuous, filled, ground and sanded smooth so the finish seams are not apparent when the unit is completed. Internal welds shall be structurally sound and eliminate racking.
 - 3. There shall be no visible seams or fasteners. Joints and connections shall be finished flush, true and smooth without defects. Finish welds on exposed surfaces, and spot welds shall be imperceptible in the finished work. No gaps, light leaks, oil-canning or waviness will be acceptable.
 - 4. Fabricate for smooth and even appearance, free from imperfections and disfigurement including pitting, warping, waviness, bulges, oil-canning or other physical deformities caused by such things as welding, material being too thin,

- fasteners, welds not being ground smooth, or any other problems not specifically mentioned here
5. Brake-Formed Aluminum: Bends shall not have crazing or cracking.
 6. Painting: Conform to paint manufacturer's requirements for surface preparation / cleaning and application.
 - a. Paints shall be evenly applied without pinholes, scratches, orange peeling, application marks and other imperfections. Workmanship, finishes and formation of letters shall conform to the highest standards of the trade.
 - b. Color breaks on the sign surface are to be sharp, without serration or color bleed. Remove paint drops, splatters, and over sprays.
 - c. The cured paint surface shall have a uniform finish that accurately matches the specified color, gloss or approved color samples.
 7. Typography And Artwork: Conform to best industry practices and the following:
 - a. Prepare original artwork for each sign. Artwork digital format files will be supplied only where indicated in the Contract Documents. Computer graphic files will be supplied by the Architect in the most recent version of Adobe Illustrator AI, PDF, or EPS formats.
 - b. Use the exact typeface specified and shown on approved shop drawings. Provide copy layouts and text for signs; provide enlarging and reducing as required for layout.
 - c. Letterforms, logos, patterns and other graphics shall be applied true to artwork / typeface and have clean edges and corners.
 - 1) Letterforms having rounded positive or negative corners, nicked, cut or ragged edges will not be acceptable.
 - 2) Letterforms shall be aligned to maintain a baseline parallel to the sign format and margins shall be maintained as per the Contract Documents.
 - 3) Photo silk-screened typography and graphics are to be sharp, without serrated or irregular edges, and exactly true to the letter style and design form.
 - 4) For the best results, silk-screening on an acrylic polyurethane coating should be done within 72 hours of the coating application.
 8. Cut Vinyl Letters And Graphics: Conform to manufacturer's requirements for surface cleaning and application.
 - a. Cut vinyl typography (including letters, arrows, numbers, symbols, logos, etc.) and graphics is to be vector artwork or photographically reproduced and computer processed (digitized or scanned) and precision machine cut.
 - b. Use the exact typefaces specified; verify prior to production if there is any question about the identity of a specified typeface.
 - c. Die cutting shall be executed in such a manner that all edges and corners are true and clean.
 - d. Adhesion to substrate shall be permanent.
 9. There shall be no visible labels, manufacturer's or otherwise, code permitting, on the completed signs. If labels are required, a sample label and intended location must be included with submittal for Architect's review.

2.05 INTERIOR SIGNAGE TYPES

- A. Sign Type 1 – Primary Room ID (Sign Panel With Insert).
 1. Signage Type: Sign panel with insert.
 2. Overall Size: 8.5" wide x 10" high.
 - a. Clear Insert Area: 8.5" wide x 5" high.
 3. Sign Construction (Sign Panel): 3 mm thick photopolymer sheet with raised text and Grade 2 braille adhered to 1/8" acrylic backer panel with 1/16" clear acrylic spacer to create area for paper inserts.

- a. ADA compliant raised copy and braille.
 - b. Finish: Paint the back face of photopolymer sheet.
 - c. Adhere sign panel layers with a clear double-faced tape.
 4. Opaque Film Back (if sign is mounted on glass): White cut vinyl 1/4" smaller than sign panel; installed on back side of glass behind sign panel.
 5. Text: Raised 0.032 inch above sign face.
 - a. Typography: Futura Light
 - b. Apply color to raised text with hot stamping foil or paint.
 6. Colors: As indicated on Drawings.
 7. Paper Inserts: Provided by sign contractor.
 8. Tack Strips: 8.5" wide x 2" high mounted below the sign.
 9. Installation: Adhere to wall using 3M VHB double-faced tape.
- B. Sign Type 2A – Secondary Room ID – Specialized Use (Sign Panel).
 1. Signage Type: Sign panel.
 2. Overall Size: 8.5" wide x 4.5" high.
 3. Sign Construction (Sign Panel): 3 mm thick photopolymer sheet with raised text and Grade 2 braille adhered to 1/8" acrylic backer panel.
 - a. ADA compliant raised copy and braille.
 - b. Finish: Paint the back face of photopolymer sheet.
 - c. Adhere sign panel layers with a clear double-faced tape.
 4. Text: Raised 0.032 inch above sign face.
 - a. Typography: Futura Light
 - b. Apply color to raised text with hot stamping foil or paint.
 5. Opaque Film Back (if sign is mounted on glass): White cut vinyl 1/4" smaller than sign panel; installed on back side of glass behind sign panel.
 6. Colors: As indicated on Drawings.
- C. Sign Type 3 – Restroom ID (Sign Panel).
 1. Signage Type: Sign panel.
 2. Overall Size: 8.5" wide x 10" high.
 3. Sign Construction (Sign Panel): 4.8 mm thick photopolymer sheet with raised text and symbol, and Grade 2 braille.
 - a. ADA compliant raised copy, symbol and braille.
 - 1) Finish: Paint the back face of photopolymer sheet.
 4. Text: Raised 0.032 inch above sign face.
 - a. Typography: Futura Light.
 - b. Apply color to raised text and symbol with hot stamping foil or paint.
 5. Colors: As indicated on Drawings.
 6. Installation: Adhere to wall using 3M VHB double-faced tape.
- D. Sign Type 4 – Maximum Occupancy (Sign Panel).
 1. Sign Type: Sign panel.
 2. Overall Size: 12" wide x 6" high.
 3. Sign Construction: 1/4" thick acrylic sheet.
 - a. Finish: Paint on back side of panel.
 4. Text: Painted on back face.
 - a. Typography: Futura Light.
 5. Colors: As indicated on Drawings.
 6. Installation: Adhere to wall using 3M VHB double-faced tape.
- E. Sign Type 6 - Exit Instructional (Sign Panel).
 1. Sign Type: Sign panel.
 2. Overall Size: 6" wide x 6" high.

3. Sign Construction: 4.8 mm photopolymer sheet with raised text and Grade 2 braille.
 - a. ADA compliant raised copy and braille.
 - b. Finish: Paint the back face of photopolymer sheet.
 4. Text: Raised 0.032 inch above sign face.
 - a. Typography: Futura Light.
 - b. Apply color to raised text and symbol with hot stamping foil or paint.
 5. Colors: As indicated on Drawings.
 6. Installation: Adhere to wall using 3M VHB double-faced tape.
- F. Sign Type 7 – Evacuation Map (Sign Panel)
1. Sign Type: Sign panel with framed insert.
 2. Overall Size: 20.5" wide x 16.75" high.
 - a. Clear Insert Area: 18" wide x 12" high.
 3. Sign Construction: 1/8" acrylic sheet.
 - a. Insert Area Frame: Surface-mounted 12" x 18" aluminum bar stock frame with tight butt joints; rout pockets to accommodate .063" non-glare acrylic sheet. Secure aluminum frame to acrylic backer panel with 3M VHB tape.
 - b. Finish: Paint on back side of panel.
 4. Text: Painted on back face.
 - a. Typography: Futura Bold.
 5. Colors: As indicated on Drawings.
 6. Paper Inserts: Evacuation map insert provided by sign contractor.
 7. Installation: Adhere to wall using 3M VHB double-faced tape.
- G. Sign Type 8 - Sprinkler Riser Room (Sign Panel)
1. Sign Type: Sign Panel.
 2. Overall Size:
 3. Sign Construction:
 - a. Finish:
 4. Text:
 - a. Typography: Futura Light.
 5. Colors: As indicated on Drawings.
 6. Installation:
- H. Sign Type 9 - Roof Access (Sign Panel)
1. Sign Type: Sign Panel.
 2. Overall Size:
 3. Sign Construction: 4.8 mm photopolymer sheet with raised text and Grade 2 braille.
 - a. ADA compliant raised copy and braille.
 - b. Finish:
 4. Text:
 - a. Typography: Futura Light.
 5. Colors: See architectural Drawings.
 6. Installation: As indicated or as otherwise directed by Architect.
- I. Sign Type 10 - Occupant Load Signs (Sign Panel)
1. Sign Type: Sign Panel.
 2. Location: Provide for assembly spaces as required.
 - a. Coordinate with Architect and Owner for occupant load numbers corresponding to maximum allowable occupancy or less, if desired, for each room.
- J. Dedication Plaque (Stainless Steel Sign)

1. Sign Type: TBD.
2. Overall Size: TBD.
3. Sign Construction: Stainless Steel.
4. Text: TBD.
 - a. Typography: Arial
5. Colors: See architectural Drawings.
6. Installation: As indicated or as otherwise directed by Architect.

PART 3 - EXECUTION

3.01 COORDINATION

- A. Coordinate signage installation with work of other trades.
- B. Coordinate signage installation schedules with General Contractor.

3.02 EXAMINATION

- A. Examine the substrate and conditions under which the signs are to be installed and verify that all such work is complete for proper installation of the signs. Installer shall notify General Contractor of unsatisfactory conditions; installer shall not proceed until unsatisfactory conditions are corrected.
- B. Verify clearance, anchorage methods and final location for each sign before installation.
- C. Install signs after all wall and ceiling surfaces are painted and finished.
- D. Start of installation indicates acceptance of substrate and conditions as acceptable.

3.03 INSTALLATION

- A. Sign installation Foreman shall be present on site and directly controlling the signage installation work at all times that signage work is in progress on site.
- B. Install signage in locations noted on Drawings in accordance with fabricator's / manufacturer's installation instructions.
 1. Install signs level, plumb, and true.
 2. Mount signage in conformance with location requirements contained in the IBC, ICC / ANSI A117.1 and Oregon Structural Specialty Code, Chapter 11, Accessibility.
 3. Mount signage securely to substrate surface in conformance with mounting methods shown on shop drawings and in compliance with fabricator's / manufacturer's instructions.
 4. Installation shall be performed by fabricator's / manufacturer's personnel trained and experienced in fabricator's / manufacturer's recommended installation methods and procedures.
 5. Install signage level, plumb and at the proper height with sign surfaces free from defects. Mounting height shall be in accordance with ADA requirements. Refer also to drawings / schedules for signage installation requirements.
 6. Upon completion of the work, remove unused or discarded materials, containers and debris from site.

3.04 WORKMANSHIP

- A. Signage shall be installed using the best workmanship, including the following:
 - 1. Consistent color, gloss and finish appearance; surfaces free of discoloration, hazing, inconsistent gloss, or defects.
 - 2. Signs installed plumb, level, in square alignment and at required height.
 - 3. Free-standing signs securely attached and free of movement or misalignment.
 - 4. No scratches, stains or damage on signs.
 - 5. Fasteners installed securely into solid backing / substrate.
 - 6. Fasteners installed square with sign face and tightened down snug without misalignment, overtightening or space under head.
 - 7. Finished surfaces free of discoloration, hazing, inconsistent gloss, or defects.

3.05 CLEANING

- A. Clean sign surfaces and touch up any flaws or marring caused during installation. Signage shall be clean and free of glue, tape, and other extraneous materials.
- B. Clean the site and signage, removing debris related to the installation of the signs.

3.06 PROTECTION OF WORK

- A. Protect signage from damage during construction.
- B. Repair any finishes on signs and surrounding architectural surfaces damaged during field installation so there is no evidence of corrective work. Return items which cannot be refinished in the field to the shop, make required alterations, and refinish the entire unit or provide new unit at fabricator's option.

3.07 FIELD QUALITY CONTROL

- A. Contractor Quality Control: Employ / assign quality control personnel to monitor the work of this section for conformance to the requirements of this section and to good construction practices.
 - 1. Contractor is solely responsible for managing and controlling the quality of the work and conformance with the requirements of this section.

3.08 SIGNAGE SCHEDULE AND LOCATION PLAN

- A. Refer to Drawings.

3.09 KEYNOTE SCHEDULE

- A. Products in this Specification Section are cited in the Drawings as KEYNOTES. See PART 2 - PRODUCTS for information on the following keynotes:

1.	KEYNOTE	DESCRIPTION
a.	101400.AL	ALUMINUM LETTERS
b.	101400.AVC	APPLIED VINYL COPY
c.	101400.DNS	DOOR NUMBER SIGN
d.	101400.HCS	HANDICAP ACCESS SIGN
e.	101400.IPS	INTERIOR PANEL SIGNS
f.	101400.MPC	MOLDED PLASTIC CHARACTERS
g.	101400.OLS	OCCUPANT LOAD SIGNS
h.	101400.RS	ROOM SIGN
i.	101400.SS	SOLID-SHEET SIGN

END OF SECTION 10 14 00

This page intentionally left blank

SECTION 10 26 00 - WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Surface-mounted stainless steel corner guards.
- B. Related Sections:
 - 1. Division 08 Section "Door Hardware" for protective trim units including door guard, kick and protection plates.
 - 2. Division 09 Section "Resilient Base and Accessories" for coordination and height installation requirements of corner protection.

1.02 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, impact strength, and fire-test-response characteristics, dimensions of individual components and profiles, and finishes for each corner protection unit.
- B. Shop Drawings: For each corner protection unit showing locations and extent. Include sections, details, and attachments to other work.
- C. Samples for Initial Selection: For each type of corner protection unit indicated.
- D. Maintenance Data: For each corner protection unit to include in maintenance manuals.
- E. Warranty: Sample of special warranty.

1.03 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Source Limitations: Obtain corner protection units from single source from single manufacturer.
- C. Product Options: Drawings indicate size, profiles, and dimensional requirements of corner protection units and are based on the specific system indicated. Refer to Division 01 Section "Quality Requirements."
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Store corner protection units in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
 - 1. Store corner protection components for a minimum of 72 hours at room temperature of 70 deg F.

1.05 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of corners, columns, and other construction contiguous with impact-resistant corner-protection units by field measurements before fabrication and indicate measurements on Shop Drawings.

1.06 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace door and wall protection components that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including detachment of components from each other or from the substrates, delamination, and permanent deformation beyond normal use.
 - b. Deterioration of metals, metal finishes, plastics, and other materials beyond normal use.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Stainless-Steel Sheet: ASTM A 240/A 240M.
- B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M) for 6063-T5.
- C. Corner Guard Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.
- D. Adhesives: As recommended by protection product manufacturer.
 - 1. Adhesives shall have a VOC content of 70 g/L or less.
 - 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.02 MANUFACTURED UNITS

- A. General:
 - 1. Source Limitations: Obtain corner guards from single source from single manufacturer.
- B. Corner Guards:
 - 1. Approved 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. Inpro Corporation (IPC).
 - b. Construction Specialties, Inc.
 - c. Babcock-Davis.
 - d. JL Industries, Inc.; a division of the Activar Construction Products Group.

- e. Korogard Wall Protection Systems; a division of koroseal Interior Products, LLC.
- f. Nystrom, Inc.
- g. Pawling Corporation.
- 2. Stainless Steel Corner Guards (SCG): Fabricated as one piece from formed or extruded metal with formed edges; with 90- or 135-degree turn to match wall condition.
 - a. Basis of Design Manufacturer:
 - 1) IPC Door and Wall Protection Systems, InPro Corporation, PO Box 406 Muskego, WI 53150 (800-222-5556).
 - b. Basis of Design Product:
 - 1) Stainless Steel Corner Guard.
 - (a) Model: IPC #181128H-304, 1-1/2 by 1-1/2 by 96 inches, 1/8 inch radius, screw-on.
 - (b) 304 Stainless Steel, 16 gauge; NSF approved.
 - (c) Height: As required for installation from top of finish floor to underside of ceiling, unless otherwise indicated on Drawings.
 - (d) Color and Texture: No. #4 satin.
 - 2) Wing Size: Nominal 1-1/2 by 1-1/2 inches.
 - 3) Corner Radius: Minimum 1/8 inch.
 - 4) Mounting: Flat-head, countersunk screws through factory-drilled mounting holes.
 - 5) Provide matching filler piece between corner guards on end walls.

2.03 FABRICATION

- A. Fabricate corner protection units to comply with requirements indicated for design, dimensions, and member sizes, including thicknesses of components.
- B. Fabricate components with tight seams and joints 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.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates and corner areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Examine wall to which corner 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 corner protection units 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.

3.02 PREPARATION

- A. Complete finishing operations, including painting, before installing impact-resistant corner protection system components.

- B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.03 INSTALLATION, GENERAL

- A. General: Install corner protection unit's 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.
 - 1. Install corner protection units in locations and at mounting heights indicated on Drawings.

3.04 CORNER GUARDS INSTALLATION

- A. Installation Quality: Install corner guards 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. Install corner guards from top of finish flooring to underside of ceiling unless otherwise indicated on Drawings.
- C. Adhesive: Field applied heavy duty adhesive.
- D. Fasteners: Pre-drilled beveled holes and phillips head screws.
- E. Accessories: Provide splices, mounting hardware, anchors, trim, joint moldings, and other accessories required for a complete installation.
 - 1. Provide anchoring devices and suitable locations to withstand imposed loads.
 - 2. Adjust end and top caps as required to ensure tight seams.

3.05 CLEANING

- A. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

3.06 KEYNOTE SCHEDULE

- A. Products in this Specification Section are cited in the Drawings as KEYNOTES. See PART 2 - PRODUCTS for information on the following keynotes:
 - 1.

KEYNOTE	DESCRIPTION
a. 102600.SCG	STAINLESS STEEL CORNER GUARD

END OF SECTION

SECTION 10 44 13 - FIRE EXTINGUISHER CABINETS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Fire protection cabinets for the following:
 - a. Portable fire extinguishers.
- B. Related Sections:
 - 1. Division 10 Section "Signage" for directional signage to out-of-sight fire extinguishers and cabinets.
 - 2. Division 10 Section "Fire Extinguishers."

1.02 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire protection cabinets.
 - 1. Fire Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, and cabinet type, trim style, and panel style.
 - 2. Show location of knockouts for hose valves.
- B. Shop Drawings: For fire protection cabinets. Include plans, elevations, sections, details, and attachments to other work.
- C. Maintenance Data: For fire protection cabinets to include in maintenance manuals.

1.03 QUALITY ASSURANCE

- A. Fire-Rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.
- B. 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.
- C. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to fire protection cabinets including, but not limited to, the following:
 - a. Schedules and coordination requirements.

1.04 COORDINATION

- A. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B. Coordinate sizes and locations of fire protection cabinets with wall depths.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
- B. Tempered Break Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 1.5 mm thick.

2.02 FIRE PROTECTION CABINET

- A. Cabinet Type: Suitable for fire extinguisher.
 - 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. J. L. Industries, Inc., a division of Activar Construction Products Group;
 - b. Kidde Residential and Commercial Division, Subsidiary of Kidde plc.
 - c. Larsen's Manufacturing Company.
 - d. Watrous Division, American Specialties, Inc.
- B. Cabinet Construction: Nonrated and 1-hour fire rated.
 - 1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.0428-inch- thick, cold-rolled steel sheet lined with minimum 5/8-inch-thick, fire-barrier material. Provide factory-drilled mounting holes.
- C. Cabinet Material: Steel sheet.
- D. Semi-recessed Cabinet: Cabinet box partially recessed in walls of sufficient depth to suit style of trim indicated; with one-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend). Provide where walls are of insufficient depth for recessed cabinets but are of sufficient depth to accommodate semirecessed cabinet installation.
 - 1. Rolled-Edge Trim: 2-1/2-inch backbend depth.
- E. Cabinet Trim Material: Steel sheet.
- F. Door Material: Steel sheet.
- G. Door Style: Vertical duo panel with frame.
- H. Door Glazing: Tempered break glass or Acrylic sheet.
 - 1. Acrylic Sheet Color: Clear transparent acrylic sheet.
- I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
 - 1. Provide projecting lever handle with cam-action latch.
 - 2. Provide continuous hinge, of same material and finish as trim, permitting door to open 180 degrees.
- J. Accessories:
 - 1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
 - 2. Break-Glass Strike: Manufacturer's standard metal strike, complete with chain and mounting clip, secured to cabinet.
 - 3. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as directed by Architect.

- a. Identify fire extinguisher in fire protection cabinet with the words "FIRE EXTINGUISHER."
 - 1) Location: Applied to cabinet door.
 - 2) Application Process: Decals.
 - 3) Lettering Color: Red.
 - 4) Orientation: Vertical.
- K. Finishes:
 - 1. Manufacturer's standard baked-enamel paint for the following:
 - a. Exterior of cabinet door, and trim except for those surfaces indicated to receive another finish.
 - b. Interior of cabinet and door.
 - 2. Steel: Baked enamel or powder coat.

2.03 FABRICATION

- A. Fire Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
 - 1. Weld joints and grind smooth.
 - 2. Provide factory-drilled mounting holes.
- B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.
 - 1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.
 - 2. Miter and weld perimeter door frames.
- C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.04 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces of fire protection cabinets from damage by applying a strippable, temporary protective covering before shipping.
- C. Finish fire protection cabinets after assembly.
- D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.05 STEEL FINISHES

- A. Surface Preparation: Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning".
- B. 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. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.
 - 1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine walls and partitions for suitable framing depth and blocking where semirecessed cabinets will be installed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Prepare recesses for semi-recessed fire protection cabinets as required by type and size of cabinet and trim style.

3.03 INSTALLATION

- A. General: Install fire protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights indicated below, or at heights acceptable to authorities having jurisdiction.
- B. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.
 - 1. Provide inside latch and lock for break-glass panels.
 - 2. Fasten mounting brackets to inside surface of fire protection cabinets, square and plumb.
- C. Identification: Apply decals at locations indicated.

3.04 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as fire protection cabinets are installed unless otherwise indicated in manufacturers written installation instructions.
- B. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of fire protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes, or replace fire protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire protection cabinet and mounting bracket manufacturers.
- E. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

3.05 KEYNOTE SCHEDULE

- A. Products in this Specification Section are cited in the Drawings as KEYNOTES. See PART 2 - PRODUCTS for information on the following keynotes:
 - 1.

<u>KEYNOTE</u>	<u>DESCRIPTION</u>
a. 104413.FEC	FIRE EXTINGUISHER CABINET - SEMI-RECESSED

END OF SECTION 10 44 13

This page intentionally left blank

SECTION 10 44 16 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.
- B. Related Sections:
 - 1. Division 10 Section "Fire Extinguisher Cabinets."
 - 2. Division 21 Sections for Wet and Dry Fire Sprinkler systems.

1.02 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.
- B. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.
- C. Warranty: Sample of special warranty.

1.03 QUALITY ASSURANCE

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
 - 1. Provide fire extinguishers approved, listed, and labeled by FMG.
- C. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to fire extinguishers including, but not limited to, the following:
 - a. Schedules and coordination requirements.

1.04 COORDINATION

- A. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

1.05 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure of hydrostatic test according to NFPA 10.
 - b. Faulty operation of valves or release levers.
 - 2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet and mounting bracket indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Amerex Corporation.
 - b. Ansul Incorporated; Tyco International Ltd.
 - c. Badger Fire Protection; a Kidde company.
 - d. J. L. Industries, Inc.; a division of Activar Construction Products Group.
 - e. Kidde Residential and Commercial Division; Subsidiary of Kidde plc.
 - f. Larsen's Manufacturing Company.
 - 2. Handles and Levers: Manufacturer's standard.
 - 3. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.
- B. Type A: Multipurpose Dry-Chemical Type in Steel Container: UL-rated 3-A: 40-B:C, 5-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.
- C. Type B: Class-K Wet Chemical Type in Stainless Steel Container: UL-rated 2-A:K, 20-lb nominal capacity, with potassium bicarbonate-based wet chemical in stainless steel container.

2.02 MOUNTING BRACKETS

- A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or black baked-enamel finish.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Amerex Corporation.
 - b. Ansul Incorporated; Tyco International Ltd.
 - c. Badger Fire Protection; a Kidde company.
 - d. J. L. Industries, Inc.; a division of Activar Construction Products Group.
 - e. Larsen's Manufacturing Company.
- B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
 - 1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.
 - a. Orientation: Vertical.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine fire extinguishers for proper charging and tagging.
 - 1. Remove and replace damaged, defective, or undercharged fire extinguishers.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. General: Install fire extinguishers and mounting brackets in locations indicated on plan and in compliance with requirements of authorities having jurisdiction.
1. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.
 2. Install fire extinguishers in cabinets specified in Division 10 section "Fire Extinguisher Cabinets" as indicated on Drawings.
- B. Locations: As indicated on Drawings.

3.03 KEYNOTE SCHEDULE

- A. Products in this Specification Section are cited in the Drawings as KEYNOTES. See PART 2 - PRODUCTS for information on the following keynotes:
1.

	<u>KEYNOTE</u>	<u>DESCRIPTION</u>
a.	104416.FXB	FIRE EXTINGUISHER BRACKET
b.	104416.FX	FIRE EXTINGUISHER

END OF SECTION 10 44 16

This page intentionally left blank

SECTION 12 24 13 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Manually operated roller shades with single rollers.
 - 2. Motor-operated roller shades with single rollers.
- B. Related Sections:
 - 1. Division 06 Section "Rough Carpentry" for wood blocking and support.
 - 2. Division 07 Section "Joint Sealants" for sealing the perimeters of installation accessories for light-blocking shades with a sealant.
 - 3. Division 09 Section "Non-Structural Metal Framing" for metal blocking and grounds for mounting roller shades and accessories.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include styles, material descriptions, construction details, 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.
 - 2. Manually Operated Shades.
- C. Samples for Initial Selection: For each type and color of shadeband material.
 - 1. Include Samples of accessories involving color selection.
- D. Samples for Verification: For each type of roller shade.
 - 1. Shadeband Material: Not less than 10 inches square in colors indicated. Mark inside face of material if applicable.
 - 2. Roller Shade: Full-size operating unit, not less than 16 inches wide by 36 inches long for each type of roller shade indicated.
 - 3. Installation Accessories: Full-size unit, not less than 10 inches long.
- E. Roller-Shade Schedule: Use same designations indicated on Drawings.

1.04 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

- B. Product Certificates: For each type of shadeband material, signed by product manufacturer.
- C. Product Test Reports: For each type of shadeband material, for tests performed by a qualified testing agency.

1.05 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For roller shades to include in maintenance manuals.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.07 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.

1.08 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.
- C. Coordination of Electrical Rough-In Locations: In sufficient time prior to installation, provide on-site coordination of electrical services to electrically operated shade locations. Verify that layout is provided prior to beginning installation.

1.09 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of roller shades that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Two (2) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design Manufacturer: Subject to compliance with requirements, provide Levolor Commercial; Roller Shades or comparable products from the following:
 - 1. BTX Window Automation, Inc.
 - 2. Draper Inc.
 - 3. Hunter Douglas Company.
 - 4. Lutron Electronics Co., Inc.
 - 5. Mecho Systems.
 - 6. Silent Gliss USA, Inc.
- B. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.02 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS (RWS)

- A. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.
 - 1. Bead Chains: Stainless steel.
 - a. Loop Length: Full length of roller shade.
 - b. Limit Stops: Provide upper and lower ball stops.
 - c. Chain-Retainer Type: Chain tensioner, jamb mounted.
 - 2. Spring Lift-Assist Mechanisms: Manufacturer's standard for balancing roller-shade weight and lifting heavy roller shades.
 - a. Provide for shade bands that weigh more than 10 lb. or for shades as recommended by manufacturer, whichever criteria are more stringent.
- B. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of 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 inside face of shade and left side of inside face of shade. Verify with Architect and building conditions.
 - 2. Direction of Shadeband Roll: Regular, from back of roller.
 - 3. Shadeband-to-Roller Attachment: Manufacturer's standard method.
- C. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
- D. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.
- E. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
 - 1. Color and Finish: As selected by Architect from manufacturer's full range.
- F. Installation Accessories:
 - 1. End Minimum Light Gap Between Shades: 1-1/2 inches, unless otherwise indicated.
 - 2. Recessed Shade Pocket: Rectangular, extruded-aluminum enclosure designed for recessed ceiling/soffit installation; with front, top, and back formed as one piece, end plates, and removable bottom closure panel. Pocket shall fully enclose shade pocket on all sides.

- a. Height: Manufacturer's standard height required to enclose roller and shadeband when shade is fully open, but not less than height indicated on Drawings.
3. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.03 MOTOR-OPERATED, SINGLE-ROLLER SHADES (MRS)

- A. Motorized Operating System: Provide factory-assembled, shade-operator system of size and capacity and with features, characteristics, and accessories suitable for conditions indicated, complete with electric motor and factory-prewired motor controls, power disconnect switch, enclosures protecting controls and operating parts, and accessories required for reliable operation without malfunction. Include wiring from motor controls to motors. Coordinate operator wiring requirements and electrical characteristics with building electrical system.
 1. Electrical Components: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 2. Electric Motor: Manufacturer's standard tubular, enclosed in roller.
 - a. Electrical Characteristics: Single phase, 24 V, 60 Hz.
 3. Remote Control: Electric controls with NEMA ICS 6, Type 1 enclosure for recessed or flush mounting. Provide the following for remote-control activation of shades:
 - a. Keyed Control Station: Keyed, momentary-contact, three-position, switch-operated control station with open, close, and off functions. Refer to Division 08 Section "Door Hardware" for cylinders keyed to Owner's keying system. Coordinate quantity of switches with hardware supplier.
 - b. Individual/Group Control Station: Keyed, momentary-contact, three-position, switch-operated control station with open, close, and center off functions for individual and group control. Refer to Division 08 Section "Door Hardware" for cylinders keyed to Owner's keying system. Coordinate quantity of switches with hardware supplier.
 - c. Timer Control: Clock timer, 24-hour and seven-day programmable for regular events.
 - d. Microprocessor Control: Electronic programmable means for setting, changing, and adjusting control features; isolated from voltage spikes and surges.
 - e. Color: As selected by Architect from manufacturer's full range.
 4. Limit Switches: Adjustable switches interlocked with motor controls and set to stop shades automatically at fully raised and fully lowered positions.
 5. Operating Features:
 - a. Group switching with integrated switch control; single faceplate for multiple switch cutouts.
 - b. Capable of interface with audiovisual, multiroom lighting and LCD Projector control system.
 - c. Capable of accepting input from building automation control system.
- B. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.

2.04 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.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Levolor Commercial; E-Screen or comparable products by one of the following:
- B. Light-Filtering Fabric (Brown Out): Woven fabric, stain and fade resistant.
 - 1. Source: Roller-shade manufacturer.
 - 2. Type: 100% PVC free.
 - 3. Orientation on Shadeband: Up the bolt.
 - 4. Openness Factor: 3 percent.
 - 5. Color: As indicated in Finish Schedule on Drawings.

2.05 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

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 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. Edges and Finish: All edge seams and end cuts shall be tailor for opening, any uneven or out of plumb seams or edges will be cause for rejection.
- C. Electrical Connections: Connect motor-operated roller shades to building electrical system.

3.03 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.04 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.

3.05 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain motor-operated roller shades.

3.06 KEYNOTE SCHEDULE

- A. Products in this Specification Section are cited in the Drawings as KEYNOTES. See PART 2 - PRODUCTS for information on the following keynotes:
 1.

<u>KEYNOTE</u>	<u>DESCRIPTION</u>
a. 122413.MRS	MOTORIZED ROLLER SHADES
b. 122413.RWS	ROLLER WINDOW SHADES

END OF SECTION 12 24 13

SECTION 12 32 00 - MANUFACTURED WOOD CASEWORK

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Plastic-laminate materials.
 - 2. PVC edgebanding for plastic laminate.
 - 3. Solid-surfacing material countertops.
- B. Related Sections:
 - 1. Division 06 Section "Interior Finish Carpentry." For wood components, trim and sills coordinated with this section.
 - 2. Division 09 Section "Resilient Base and Accessories" for resilient base applied to manufactured wood casework.
 - 3. Division 22 Plumbing for plumbing coordination.
 - 4. Division 26 for electrical devices located in casework.

1.02 REFERENCES

- A. AWI (AWS) - Architectural Woodwork Standards.
- B. AWI (QCP) - Quality Certification Program, current edition at www.awiqcp.org.
- C. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards.
- D. ANSI/BHMA A156.9 - Cabinet hardware.
- E. NEMA LD3 - High pressure decorative laminate.
- F. WI (CCP) - Certified Compliance Program; current edition at www.woodworkinstitute.com.
- G. Particleboard: ANSI 208.1.
- H. Softwood plywood - US Products Standards PS1.
- I. PVA adhesive (polyvinyl acetate) white glue, Type II ASTM-D3110.
- J. Aliphatic adhesive (carpenter's glue) Type II.
- K. Solvent-based contact cement MMM-A-J1308.

1.03 DEFINITIONS

- A. Definitions in the AWI/AWMAC/WI's "Architectural Woodwork Standards" apply to the Work of this Section.
- B. Exposed Exterior Surfaces: defined as all exterior surfaces exposed to view, including:
 - 1. All surfaces visible when doors and drawers are closed, including knee spaces.
 - 2. Underside of cabinet bottoms over 42 inches above the finished floor, including cabinet bottoms behind light valences and the bottom edge of light valences.

3. Cabinet tops under 80 inches above the finished floor, or if 80 inches and over and visible from an upper building level or floor.
 4. Front edges of stretchers, ends, divisions, tops, and bottoms.
 5. Sloping tops of cabinets that are visible.
- C. Exposed Interior Surfaces: defined as all interior surfaces exposed to view in open casework or behind transparent doors, including:
1. Shelves, including edgebanding.
 2. Divisions and partitions (front end in an exposed surface).
 3. Interior face of ends (sides), backs, and bottoms (including pull outs). Also included are the interior surfaces of cabinet top members 36 inches or more above the finished floor.
 4. Interior face of door and applied drawer fronts.
- D. Semi-Exposed Surfaces: defined as those interior surfaces only exposed to view when doors or drawers are opened, including:
1. Tops and bottoms of shelves, including front edgebanding (front edge is an exposed surface).
 2. Divisions and partitions (front edge is an exposed surface).
 3. Interior face of ends (sides), backs, and bottoms (including a bank of drawers). Also included are the interior surfaces of cabinet top members 35 inches or more above the finished floor.
 4. Drawer sides, sub fronts, backs, and bottoms.
 5. The underside of cabinet bottoms between 24 and 42 inches above the finished floor.
 6. Security and dust panels or drawer stretchers.
- E. Concealed Surfaces: defined as those exterior or interior surfaces that are covered or not normally exposed to view including:
1. Toe space unless otherwise specified.
 2. Sleepers, stretchers, and solid sub tops.
 3. The underside of cabinet bottoms less than 24 inches above the finished floor.
 4. The flat tops of cabinets 80 inches or more above the finished floor, except if visible from an upper floor or building level.
 5. The three non-visible edges of adjustable shelves.
 6. The faces of cabinet ends of adjoining units that butt together.
- F. Plywood: a panel manufactured of three or more layers (plies) of wood or wood products (veneers or overlays and/or core materials), generally laminated into a single sheet (panel).
1. Primary Core Materials:
 - a. Veneer Core: Traditional "Plywood" consisting of a panel core made up of an odd number of plies, 3 or more alternating layers of veneers, pressed and glued into a single sheet. The two outside veneer layers are the face and back. Veneer core is further separated into two groups according to materials and manufacturing:
 - 1) Hardwood Veneer: Panels manufactured of hardwood veneers.
 - 2) Softwood Veneer: Panels manufactured of softwood veneers.
 - b. Veneer core shall not be used in cabinet construction, except where indicated for the following:
 - 1) Cabinet bases (toe kick materials).
 - 2) Drawer sides, backs, and bottoms.
 - 3) Vertical dividers.
 - c. Combination Core: Cores constructed of three or five plies of veneer, sandwiched between laminations of MDF. Typically the combination of

these materials result in stronger lighter weight, dimensionally stable panels with increased screw holding ability, and superior surface flatness. Combination core shall be used for all cabinet construction, including the following:

- 1) Cabinet tops, bottoms, ends.
- 2) Shelves.
- 3) Doors.
- 4) Drawer fronts.

1.04 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work. Show fabrication details, including types and locations of hardware. Show installation details, including field joints and filler panels. Indicate manufacturer's catalog numbers for casework.
- C. Samples for Initial Selection: For cabinet finishes and for each type of material indicated.
 1. CFC Combination Core.
 2. Plastic Laminate: Three (3) samples, 8-by-10-inch, for each type of finish and edging.
 3. Hardware: One (1) sample of each type and finish.
 4. Edgebanding: 6 inches in length of thickness indicated.
 5. Solid surface worksurfaces: One (1) sample of each color and edging, 6 inches square.
- D. Samples for Verification: For cabinet finishes and for each type of material indicated and the following:
 1. CFC Combination Core.
 2. Plastic Laminate: Three (3) samples, 8-by-10-inch, for each type of finish and edging.
 3. Hardware: One (1) sample of each type and finish.
 4. Edgebanding: 6 inches in length of thickness indicated.
 5. Edgebanding: 6 inches in length of thickness indicated.
- E. Schedule: Submit Keying Schedule of locks listing each room (by number), each location (by N/S/E/W wall), each cabinet (upper, lower, full height - door or drawer); so Owner's keying requirements can be marked thereon and transmitted to Contractor.
- F. Qualification Data: For qualified Installer.
- G. Warranty: Sample of special warranty.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum three years of documented experience.
- B. Quality Standards: Comply with AWP (QCP) or WI (CCP) woodwork association quality standards in accordance with requirements for work specified in this Section.
 1. Grade: Premium.
 2. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.

- C. Installer Qualifications: Certified participant in AWI's Quality Certification Program; or a certified participant of WI's Certified Compliance Program; or a non-certified installer that is able to install to WI's Certified Compliance Program requirements per the NAAWS.
- D. Source Limitations: Obtain manufactured laminate casework and countertops from single source from a single manufacturer.
- E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockups of each type of casework in locations designated by Architect.
 - 2. Build mockups to dimensions indicated, or, if not indicated, as directed by Architect.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
 - 4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver manufactured wood casework only after painting, utility roughing-in, and similar operations that could damage, soil, or deteriorate casework have been completed in installation areas. If casework must be stored in other than installation areas, store only in areas where environmental conditions meet requirements specified in "Project Conditions" Article.
- B. Keep finished surfaces covered with polyethylene film or other protective covering during handling and installation.

1.07 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install manufactured wood casework until spaces are enclosed and weathertight, utility roughing-in, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions acceptable based upon referenced standards at occupancy levels during the remainder of the construction period.
 - 1. Maintain temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during the remainder of the construction period.
- B. Field Measurements: Verify actual dimensions of construction contiguous with manufactured laminate casework by field measurements before fabrication.

1.08 COORDINATION

- A. Coordinate layout and installation of framing and reinforcements in walls and partitions for support of manufactured laminate casework.

1.09 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of manufactured wood casework that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
 - a. Delamination of components or other failures of glue bond.
 - b. Warping of components.
 - c. Failure of operating hardware.
 - d. Deterioration of finishes.
2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:
1. Advanced Custom Cabinets (Coeur d'Alene, ID).
 2. Anderson Clark Interiors, ACI (Bend, OR).
 3. Cascade Casework (Lebanon, OR).
 4. Frontier Door & Cabinet LLC (Tacoma, WA).
 5. Genothern (Tumwater, WA).
 6. Interior Wood Products (Olympia, WA).

2.02 MATERIALS, GENERAL

- A. Maximum Moisture Content for Lumber: 7 percent for hardwood and 12 percent for softwood.
- B. Hardwood Plywood: HPVA HP-1.
- C. Softwood Plywood: DOC PS 1.
- D. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue (at wet locations).
- E. CFC Combination Core: Veneer core consisting of Western softwood inner core, with outer plies on both faces consisting of medium density fiberboard (MDF) resulting in a smooth laminating surface with minimal telegraphing. 5-ply for 1/2 inch thickness, 7-ply for 3/4 inch thickness, and 9-ply for 1 inch thickness.
1. Basis of Design Product: Roseburg SkyPly Combination Fiber Core CFC Veneer Core panels with no added urea-formaldehyde, or approved equal.
- F. Marine Grade Veneer Core: Marine-grade plywood that is produced entirely of Group 1 species of veneer, sanded on both faces. The maximum core-gap size permitted is 1/8 inch. Its exposure durability rating is EXTERIOR and the glue used is a water resistant structural adhesive.
1. Basis of Design Product: Roseburg AB Marine with grade A face panel, Grade B or better western softwood and Grade B back. No added urea-formaldehyde (NAUF), exterior, water resistant phenolic glue. Or approved equal.
 - a. Marine Grade Veneer Core shall be used for all cabinet construction, including the following:
 - 1) Counter subtops at wet locations
 - 2) Toe Kick materials.
- G. Plastic Laminate (PL): High-pressure decorative laminate complying with NEMA LD 3.
1. Basis-of-Design Products: Subject to compliance with requirements, provide as indicated in Finish Schedule on Drawings, or comparable products by one of the following:
 - a. Arborite, operating as Wilsonart International Holdings LLC.

- b. Formica Corporation.
 - c. Nevamar Company, LLC; Decorative Products Div.
 - d. Lamin-Art, Inc.
- H. Edgebanding for Plastic Laminate (PVC):
 - 1. 1mm PVC banding, machine applied.
 - 2. 3mm PVC banding, machine applied and machine profiled to 1/8 inch radius where indicated.
 - 3. Edgebanding Locations:
 - a. Cabinet Bodies with Door/Drawer Face: 3 mm PVC.
 - b. Cabinet Bodies Where Open Compartment: 3 mm PVC.
 - c. Cabinet Shelves with Door Face: 1 mm PVC on front edge only, except at glass doors, use Grade VGS plastic laminate.
 - d. Cabinet Shelves Where Open Compartment: 3 mm PVC on front edge only.
 - e. Cabinet Door/Drawer Faces: 3 mm PVC.
 - f. Countertop: 3 mm PVC.
 - g. Window Sills: 3 mm PVC.
 - 4. PVC Color Selections: Select from the Vendor Stock PVC Program, including colors matched to specified laminates.

2.03 CABINET MATERIALS

- A. Exposed Cabinet Materials:
 - 1. Plastic Laminate:
 - a. Countertop Surfaces: Grade HGS.
 - b. Exposed Casework Surfaces: Grade VGS.
 - 2. Provide specified PVC edge-banding on all exposed edges, except at cabinets with glass doors, provide Grade VGS edge banding on shelves.
- B. Semi-Exposed Cabinet Materials:
 - 1. Plastic Laminate: Grade VGS.
 - a. Provide plastic laminate for interior faces of doors and drawer fronts and where indicated.
 - 2. Thermoset Decorative Panels: Provide thermoset decorative panels for semi-exposed surfaces unless otherwise indicated.
 - 3. Unless otherwise indicated, provide specified edge-banding on all semi-exposed edges.
- C. Concealed Cabinet Materials:
 - 1. Balanced construction of all laminated panels is mandatory. Unfinished core stock surfaces, even on concealed surfaces, is not permitted.

2.04 DESIGN, COLOR, AND FINISH

- A. Design: Provide manufactured laminate casework of the following design:
 - 1. Reveal overlay with wire pulls. Provide base, wall, and full height units with drawer fronts, doors, and fixed panels overlaying and partially concealing cabinet body, unless otherwise indicated.
- B. Thermoset Decorative Panel Colors, Patterns, and Finishes: White.
- C. Plastic-Laminate Colors, Patterns, and Finishes: As indicated in Finish Schedule on Drawings or as selected by Architect from plastic-laminate manufacturer's full range of standard and premium colors and finishes.

- D. PVC Edgebanding: Woodtape, or as selected by Architect from manufacturer's complete line.
 - 1. Edgebanding Color to match exterior laminate.

2.05 CABINET FABRICATION

- A. Plastic-Laminate-Faced Cabinet Construction: As required by referenced quality standard, but not less than the following:
 - 1. Bottoms and Ends of Cabinets, and Tops of Wall Cabinets and Tall Cabinets: 3/4-inch combination core plywood, plastic-laminate faced on exposed surfaces, thermoset decorative panels on semi-exposed surfaces.
 - a. Cabinet Bases: Factory assembled and factory attached to each individual cabinet. Cabinet sides extending to the floor will not be accepted. Fabricate from veneer core plywood, 3/4-inch thick.
 - 2. Tops and bottoms shall be glued and doweled to cabinet sides and internal cabinet components such as fixed horizontals, rails and verticals. Minimum 6 dowels each joint for 24 inch deep cabinets and a minimum of 4 dowels each joint for 12 inch deep cabinets. Mechanical or metal hardware fasteners joining cabinet top and bottom panels to the sides will not be accepted.
 - 3. Shelves: 1 inch thick combination core plywood core, plastic-laminate faced on exposed surfaces, thermoset decorative panels on semi-exposed surfaces.
 - 4. Backs of Cabinets: 1/4 inch thick medium density fiberboard panel fully captured by the cabinet top, bottom and side panels. Finish to match cabinet interior. 3/4 by 4 inch particleboard rails shall be placed behind the back panel at the top and bottom, and doweled to the sides utilizing 10mm hardwood fluted dowels. A third intermediate rail shall be included on all cabinets taller than 56 inches. Utilize hot melt glue to further secure back and increase overall strength. Plastic-laminate faced on exposed surfaces, thermoset decorative panels on semi-exposed surfaces.
 - 5. Drawer Fronts: 3/4-inch combination core plywood, plastic-laminate faced.
 - 6. Drawer Sides and Backs: 1/2-inch solid-wood or veneer core hardwood plywood, with glued dovetail or multiple-dowel joints.
 - 7. Drawer Bottoms: 1/4-inch hardwood plywood glued and dadoed into front, back, and sides of drawers. Use 1/2-inch material for drawers more than 30 inches wide.
 - 8. Doors: 3/4-inch combination core plywood, plastic-laminate faced.
 - 9. Cabinet Sub-Tops: Base units, except sink base units: Full sub-top glued and doweled to cabinet sides. Mechanical or metal hardware fasteners joining cabinet sub-top panel to the sides will not be accepted.
 - a. Sink base units are provided with open top and a stretcher at the front, attached to the sides. Back to be split removable access panel.
 - 10. Fasteners: Do not use exposed fasteners except where unavoidable. Match finish of metal fastener to surrounding material, unless otherwise indicated. Provide Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.
 - 11. Adhesives: Rigid PVA glue line, of adhesives designed for laminate applications. Spray on adhesives will not be allowed.
- B. Filler Strips: Provide as needed to close spaces between cabinets and walls, ceilings, and indicated equipment. Fabricate from same material and with same finish as cabinets.
 - 1. Cabinet top and bottom corner filler: same as cabinet construction. Close off the top and bottom of casework intersecting corners (inside and outside corners).

- C. Adjustable Vertical Dividers: Provide vertical dividers for manufactured casework where indicated in Drawings.
 - 1. Provide 1/4 inch thick plywood, inserted into slots in casework. Sand smooth all edges. Provide 1/4 inch thick dividers as specified to a maximum height of 18 inches.
 - 2. Provide 1/2 inch thick combination core plywood with melamine overlay on both sides and 0.018 inch PVC edgebanding on exposed edges. Provide 1/2 inch thick dividers as specified to a maximum height of 30 inches.
 - 3. Provide 3/4 inch thick combination core plywood with melamine overlay on both sides and 0.018 inch PVC edgebanding on exposed edges. Provide 3/4 inch thick dividers as specified to a maximum height of 36 inches.
- D. Fixed Vertical Dividers: Provide 3/4 inch combination core plywood panels doweled to cabinet components.

2.06 CASEWORK HARDWARE AND ACCESSORIES

- A. Hardware, General: Unless otherwise indicated, provide manufacturer's standard satin-finish, commercial-quality, heavy-duty hardware.
- B. Butt Hinges: Chrome-plated, semi-concealed, 5-knuckle hinges complying with BHMA A156.9, Grade 1, with antifriction bearings and rounded tips. Provide 3 hinges for doors less than 36 inches high and 4 hinges for doors more than 36 inches high.
 - 1. Swing: 270 degree swing.
- C. Pulls: Solid aluminum or chrome-plated brass wire pulls, fastened from back with two screws. For sliding doors, provide recessed chrome-plated flush pulls.
 - 1. Select from the manufacturer's pre-approved Vendor Stock Pull Program.
 - 2. Metal wire pull; satin chrome finish.
 - 3. All pulls with 96 mm spacing on screws. Pull designs shall comply with the Americans with Disability Act (ADA).
- D. Door Catches: Zinc-plated, dual, self-aligning, permanent magnet catch. Provide 2 catches on doors more than 48 inches high. Pull force shall not exceed 5 lb. per Americans with Disability Act (ADA).
- E. Drawer Slides: BHMA A156.9, Type B05051/B05052/B05053.
 - 1. Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted; full-extension type; zinc-plated, steel ball-bearing slides.
 - 2. Box Drawer Slides: Grade 1HD-100.
 - 3. File Drawer Slides: 1HD - 150 lb. rated, full extension for all file drawers.
 - 4. Pencil Drawer Slides: Grade 1.
 - 5. Keyboard Slides: Grade 1HD-100, for computer keyboard shelves.
 - a. Keyboard Shelf: Slide-out tray with 4-way tilt, 360 degrees swivel, 1/2 inch travel and pull-out mouse pad by following, or approved:
 - 1) Weber-Knapp (800) 828-9254.
 - 2) Keyboardtray.net.
- F. Drawer Stops: Provide BBW No. W06, Glynn Johnson No. 22, Ives No. 21, or Quality No. 1337B resilient bumpers so drawer stop is achieved by contact of two (2) bumpers in backside of each drawer front with face of cabinet frame.
- G. Label Holders: Stainless steel, sized to receive standard label cards approximately 1 by 2 inches, attached with brads.
 - 1. Provide label holders where indicated.

- H. Drawer and Door Locks: 5-pin tumbler, complying with ANSI BHMA A156.11, Grade 1.
 - 1. Olympus Lock, Inc. Contact Adam Nelson (206-972-1497).
 - a. Finish: Satin Chrome, US 26D.
 - b. Drawer Locks: 200DW.
 - c. Doors Locks: 100DR.
 - d. Cam type locks are not acceptable.
 - 2. Provide locks for the following locations:
 - a. As indicated on Drawings.
 - 3. Keying: Key cabinet locks alike in each room, but key assignable cabinets and drawers differently. Key each room differently from other rooms. Sub-master areas of rooms into groups and master key Project in accordance with Owner's keying requirements. Keying requirements for all casework will require the Contractor to coordinate with Owner's keying which will be determined at a keying meeting held by the Contractor with the Owner's staff. Provide for the Owner's review a keying schedule as part of the final shop drawings required for this Section.
- I. Adjustable Shelf Clips: PX Industries, Allen Fields Co., Heavy Duty # 55536 clear (W.I.C. rated 500 lbs.) clips with double pin or approved; with four (4) per shelf (up to 36 inch wide), suitable for 32mm pin spacing and 3/4 inch or 1 inch shelf thickness.
- J. Grommets for Cable Passage through Countertops: 3-inch OD, black, molded-plastic grommets and matching plastic caps with slot for wire passage.
- K. Round Air Grommet: Round air grommet cap fits standard EDP (2.5 inch) and ZG (4.5 inch) Grommets by Mockett & Company or approved. Color as selected by Architect from manufacturer's standard colors.
- L. French Cleat (FC); Heavy duty rail and bracket.
 - 1. Basis of Design Product: Monarch; MFSS Heavy Duty Clip.
 - a. Material: 304 Stainless Steel.
 - b. Stock Clip Size: 1 1/2 inch.
 - c. Stock Continuous Length: 48 inches.
 - d. Projection: 1/4 inch.
 - e. Lift Off: 3/4 inch.
 - f. Fasteners: #8 pan head.
- M. Steel Support Brackets: Min. 11 gauge steel, epoxy powder coated, with integral cleat mount opening.
- N. Steel Support Bracket: Provide where indicated to support countertop or workstation top without cabinets below.
 - 1. Basis of Design: US Futaba 12" x 12" L-Shape Hybrid Workstation Bracket item number USF-72531-82-215 or comparable.

2.07 COUNTERTOPS

- A. Countertops, General: Provide smooth, clean exposed tops and edges in uniform plane free of defects.
- B. Adhesive for Bonding Plastic Laminate: Rigid PVA glue line, of adhesives designed for laminate applications. Spray on adhesives will not be allowed.
- C. Countertop Configuration: Except for solid surfacing tops, provide countertops with following front style (nose), and backsplash type, unless otherwise indicated:

1. Scribed Backsplash: Style B (Square Edge with Scribe) with plastic laminate face, top, and ends; 4 inches high unless indicated otherwise.
 2. Thickness: As indicated or, if not indicated, not less than 1-1/2 inches with substrate (core) not less than 3/4 inch thick.
 3. Use plywood made with exterior glue for countertops containing sinks.
- D. Solid Surface Material Countertops (SSM):
1. Locations: Where indicated on Drawings.
 2. Basis of Design Product: DuPont (E. I. du Pont de Nemours and Company). Provide Corian®, Solid Surface, subject to compliance with the requirements.
 - a. Material: pigments and resin.
 - b. Thickness:
 - 1) 1/2 inch.
 - c. Edge treatment: Build up, as indicated in Drawings.
 - d. Appliance Edge: Finished.
 3. Sink mounting: Refer to plumbing specifications for sink types.
 - a. Integrated.
 - b. Undermount.
 - c. Drop in.
 4. Backsplash and Endsplash:
 - a. Applied.
 5. Corian® Solid surface performance properties (TYPICAL RESULTS):
 6. Flexural Strength > 10,000 psi ASTM D790
 7. Flexural Modulus 1.2×10^6 psi ASTM D790
 8. Compression Strength (Dry) 27,300 psi ASTM C170
 9. Compression Strength (Wet) 24,400 psi ASTM C170
 - a. Hardness >85-Rockwell "M" scale min. ASTM D785
 - b. Thermal Expansion 2.2×10^{-5} inch/inch/°F ASTM E228
 - c. Colorfastness Passes NEMA LD 3-3.3
 - d. Matte (60° Gardner) 5-20 ANSI Z124
 - e. Stain Resistance Passes CSA B45.5-11/IAPMO Z124-2011
 - f. Fungal Resistance No observed growth on product ASTM G 21
 - g. Bacterial Resistance No observed growth on product ASTM G 22
 10. Flammability Class 1 and A when tested to UL 723.
 11. Color and Pattern: As indicated in Finish Schedule in Drawings.
 12. Adhesives: For seams and drop edges, Corian® Joint Adhesive to create color-coordinated seam.
 - a. VOC Limits for Installation Adhesives and Glues: Use installation adhesives that comply with the limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - b. Joints:
 - 1) Locate joints away from sinks and over or near supports.
 - 2) Maximum 1/8 inch wide, bonded with epoxy grout.
 - 3) Make joints between two surfaces level.
 13. Sink/bowl mounting hardware: Manufacturer's approved sink setters, bowl clips and fasteners for attachment of undermount sinks/bowls

2.08 SERVICE FITTINGS

- A. See Sections in Divisions 22, 23 and 26 for service fittings and connections to plumbing, HVAC and electrical services required for casework installation.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of framing and reinforcements, and other conditions affecting performance of manufactured wood casework.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 CASEWORK INSTALLATION

- A. Install level, plumb, and true; shim as required, using concealed shims. Where manufactured wood casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
- B. Base Cabinets: Set cabinet's straight, level, and plumb. Adjust subtops within 1/16 inch of a single plane. Fasten cabinets to masonry or framing, wood blocking, or reinforcements in walls and partitions with fasteners spaced 24 inches o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform. Align similar adjoining doors and drawers to a tolerance of 1/16 inch.
 - 1. Where base cabinets are not installed adjacent to walls, fasten to floor at toe space with fasteners spaced 16 inches o.c. Secure sides of cabinets to floor, where they do not adjoin other cabinets, with not less than two fasteners.
- C. Wall Cabinets: Hang cabinet's straight, level, and plumb. Adjust fronts and bottoms within 1/16 inch of a single plane. Fasten to hanging strips, masonry, or framing, blocking, or reinforcements in walls or partitions. Align similar adjoining doors to a tolerance of 1/16 inch.
 - 1. Fasten through back, near top and bottom, at ends, and not more than 16 inches o.c.
 - 2. Use expansion anchors at solid masonry.
 - 3. Use No. 10 wafer-head screws sized for 1-inch penetration at wood hanging strips.
 - 4. Use No. 10 wafer-head screws sized for 1-inch penetration into wood framing or blocking at wood-framed partitions.
- D. Install hardware uniformly and precisely. Set hinges snug and flat in mortises unless otherwise indicated. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.
- E. Adjust casework and hardware so doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

3.03 INSTALLATION OF TOPS

- A. 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 plastic-laminate 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.

- B. Secure tops to cabinets with Z- or L-type fasteners or equivalent, using two or more fasteners at each front, end, and back.
- C. Solid Surface mounting adhesives, use 100 percent silicone sealant.
- D. Abut top and edge surfaces in one true plane, with internal supports placed to prevent deflection.
- E. Secure backsplashes and end splashes to tops with concealed metal brackets at 16 inches o.c. and walls with adhesive.
- F. Seal junctures of tops, splashes, and walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.
- G. Fabricate components to greatest extent practical to sizes and shapes indicated, in accordance with approved shop drawings and manufacturer's printed instructions and technical bulletins.
- H. Form joints between components using manufacturer's standard joint adhesive.
 - 1. Reinforce as required.
 - 2. Provide factory cutouts for plumbing fittings and bath accessories as indicated on the drawings.
 - 3. Rout and finish component edges with clean, sharp returns.
 - 4. Rout cutouts, radii and contours to template.
- I. Install components plumb and level, in accordance with approved shop drawings and product installation details.
 - 1. Tops:
 - a. Flat and true to within 1/8 inch (3 mm) of a flat surface over a 10-foot length.
 - b. Allow a minimum of 1/16 inch to a maximum of 1/8 inch (3 mm) clearance between surface and each wall.
 - c. Solid Surface Tops: Form field joints using manufacturer's recommended adhesive (Corian® Joint Adhesive), with joint widths no greater than 1/8 inch (3 mm) in finished work.
 - d. Keep components and hands clean when making joints.
 - 2. Sinks/Lavatory Bowls: Adhere undermount sinks/lavatory bowls to countertops using manufacturer's recommended adhesive and mounting hardware.
 - a. Adhere undermount sinks/lavatory bowls to countertops using manufacturer's recommended adhesive and mounting hardware.
 - b. Adhere drop-in sinks/bowls to countertops using silicone sealant and manufacturer-recommended adhesives.
 - c. Provide backsplashes and endsplashes as indicated on the drawings.
 - 3. Provide backsplashes and endsplashes as indicated on the drawings.

3.04 CLEANING AND PROTECTING

- A. Repair or remove and replace defective work as directed on completion of installation.
- B. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.
- C. Protection: Provide 6-mil plastic or other suitable water-resistant covering over countertop surfaces. Tape to underside of countertop at a minimum of 48 inches o.c. Remove protection at Substantial Completion.

3.05 KEYNOTE SCHEDULE

- A. Products in this Specification Section are cited in the Drawings as KEYNOTES. See PART 2 - PRODUCTS for information on the following keynotes:

1.	<u>KEYNOTE</u>	<u>DESCRIPTION</u>
a.	123200.PL	PLASTIC LAMINATE
b.	123200.SSM	SOLID SURFACING MATERIAL

END OF SECTION 12 32 00

This page intentionally left blank

SECTION 12 48 13 - ENTRANCE MATS

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes the following:
 - 1. Entrance Walk-off Matting: Surface type fully adhered.
- B. Related Sections:
 - 1. Division 09 Section "Tiling" for ceramic tile.
 - 2. Division 09 Section "Carpeting" for carpeting.

1.02 QUALITY ASSURANCE

- A. Furnish entrance floor mats and accessories by one manufacturer for entire project.
- B. Accessibility Requirements: Provide installed floor mats that comply with Section 4.5 in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)." Sections 302 and 303 in ICC A117.1.
- C. Comply with manufacturer's instructions and recommendations for preparation of substrate, installation of anchors, and application of entrance floor mats.
- D. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication to ensure proper fitting of work.

1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM E648 Radiant Panel, Critical Radiant Flux.
 - 2. ASTM E662 Smoke Density, Flaming Mode.
 - 3. Surface Flammability Passes CPSC FF 1-70.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications and installation instructions, and recommendation and techniques, for each type of floor mat. Include proper installation method for each type of floor mat substrate required for Project.
- B. Shop Drawings: Submit shop drawings for all items specified, showing all pertinent construction features. Show the following:
 - 1. Items penetrating floor mats and frames.
 - 2. Divisions between mat sections.
 - 3. Perimeter floor moldings.
- C. Samples: Submit samples (4" x 6" size) of each floor mat selected to be furnished for Project. Architect's/Owner's review of samples will be for design, color, and finish only. Compliance with other requirements is exclusive responsibility of Contractor.

- D. Protection of Entrance Mats: Do not install project entrance mats until just prior to Substantial Completion. This will avoid excessive soiling and complete cleaning.
- E. Maintenance data.

1.05 WARRANTY

- A. Limited (3) Three Year Warranty.

1.06 O&M MANUALS

- A. Maintenance Data:
 - 1. Submit manufacturer's specified product printed instructions for cleaning and maintenance.
 - 2. Recommendations for vacuuming and spot removal.
 - 3. Submit scheduled maintenance recommendations.

PART 2 - PRODUCTS

2.01 ENTRY MATTING SYSTEMS

- A. Surface Mounted Entry Mats SM:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Matter Surfaces; Super Nop 52, or a comparable product.
 - a. Matter Surfaces; Super Nop 52.
 - b. Or approved.
 - 1) Roll Size: Width 6'-7", length 101'-8" or Width 13'-2" x length 101'-8".
 - 2) Construction: Needle punched, 3/8 inches.
 - 3) Color: Charcoal.
 - 4) Type of Pile: heavy weight loop.
 - 5) Fiber Composition: 100% solution dyed UV stabilized polypropylene fibers.
 - 6) Total Weight: 93 oz. Per yd².
 - 7) Total Thickness: 1/2 inch.
 - 8) Pile weight: 52 oz. per yd².
 - 9) Soil resistance: UV and permanent stain resistance.
 - 10) Fire Resistance Test: ASTM D2859 CPSC FF1-70.
 - c. b. Adhesive: Type recommended and approved by mat manufacturer for interior or exterior wet, high traffic areas.

2.02 FABRICATION

- A. Floor Mats: Shop fabricate units to greatest extent possible in sizes indicated. Unless otherwise indicated, provide single unit for each mat installation; do not exceed manufacturer's recommended maximum sizes for units that are removed for maintenance and cleaning. Where joints in mats are necessary, space symmetrically and away from normal traffic lanes. Miter corner joints in framing elements with hairline joints or provide prefabricated corner units without joints.
- B. Coat surfaces of aluminum frames that will contact cementitious material with manufacturer's standard protective coating.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Installer must examine substrates and conditions under which floor matting is to be installed and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install fully adhered surface-type fully adhered entrance mats at locations shown, complying with manufacturer's instructions. Coordinate top of mat surfaces with doors that swing across mats to provide under door clearance.

3.03 PROTECTIONS

- A. Installation: Install floor mats when project is within thirty (30) days of Substantial Completion, when no further heavy wheeled construction traffic will occur and wet soiling type operations, including painting and decorating, are complete within areas of floor matting.

3.04 KEYNOTE SCHEDULE

- A. Products in this Specification Section are cited in the Drawings as KEYNOTES. See PART 2 - PRODUCTS for further information on the following keynotes:
 - 1.

<u>KEYNOTE</u>	<u>DESCRIPTION</u>
a. 124813.SM	SURFACE MOUNTED ENTRANCE MAT

END OF SECTION 12 48 13

This page intentionally left blank