

CSD - CVHS FIBER BACKBONE REPLACEMENT

PIVOT ARCHITECTURE PROJECT NO. 1832.02

PROJECT MANUAL – VOLUME 1 OF 2
SPECIFICATIONS DIVISIONS 00 - 14

ISSUED FOR CONSTRUCTION
AUGUST 28, 2020



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- NOT USED -

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ARCHITECTURE – Division 01-14:

PIVOT Architecture
44 West Broadway, Suite 300
Eugene, OR 97401
Tel: 541.342.7291
www.pivotarchitecture.com



PLUMBING/MECHANICAL – Div. 21-23:

Systems West Engineers, Inc.
725 A Street
Springfield, OR 97477
Tel: 541.342.7210
www.systemswestengineers.com.



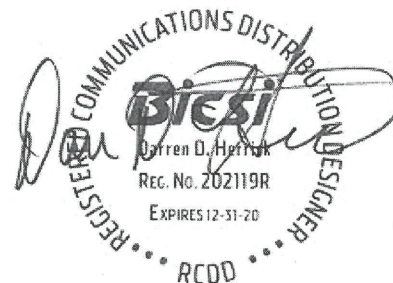
ELECTRICAL – Div. 26:

Systems West Engineers, Inc.
725 A Street
Springfield, OR 97477
Tel: 541.342.7210
www.systemswestengineers.com.



COMMUNICATIONS/ELECTRONIC
SAFETY AND SECURITY – Div. 27-28:

NIS
4900 SW Griffith Drive, # 250
Beaverton, OR 97005
Tel: 503.246.8585
www.NIS.consulting.com



END OF DOCUMENT 00 0107

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SECTION 01 1000 – SUMMARY

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. General requirements.
- B. Work covered by Contract Documents.
- C. Standard working hours/days.
- D. Delegated design requirements.
- E. Contractor use of premises.
- F. Hazardous materials survey and abatement, where occurs.
- G. Related work by Owner or others.
- H. Owner furnished products.

1.2 GENERAL REQUIREMENTS

- A. Time of Completion:
 - 1. The work of this Contract shall commence on the date of written Notice to Proceed and shall be complete by the dates established in the Owner-Contractor Agreement, and as stipulated in the General Conditions of the Contract for Construction.
- B. Asbestos-Free Certification:
 - 1. Absolutely no materials containing asbestos are to be furnished or installed or re-installed as part of this Project. Ensure that subcontractors and the Contractor's own work forces do not install materials containing asbestos. At final closeout of the Project, provide Owner certification that no materials containing asbestos have been installed in the Project and, the Project is asbestos-free as required by the State of Oregon.
- C. Coordination:
 - 1. The Contractor is responsible for overall coordination of the Project.
 - 2. The Drawings and Specifications are arranged for convenience only and do not determine which trades perform the various portions of the Work.
 - 3. Structural Specifications are embedded within drawings, coordinate with the Project and Work.
 - 4. Coordinate sequence of work to accommodate agreed-upon Owner occupancy.
 - 5. Perform necessary work to receive and/or join the work of all trades.
 - 6. Verify location of existing utilities and equipment and protect from damage.

D. Permits and Fees:

1. The Owner is responsible for filing and paying for building permits and fees associated with the building permit and system development charges.

E. The Contractor is responsible for obtaining all Project construction permits and will have full responsibility for requirements of and payments for all trade permits (i.e. electrical, plumbing, mechanical) and all costs associated with deferred submittals. Requirements for Contractor, subcontractors, and material suppliers include:

1. Ensure that persons performing the Work comply with Owner's tobacco policy. Copies made available upon request.
2. Subcontractors shall refrain from contact with staff and students at all times.
3. Neither the Contractor nor its subcontractors of any tier shall utilize any employee at the site who has pled guilty to or been convicted of any felony crime involving the physical neglect of a child, physical injury to or death of a child, sexual offenses against or sexual exploitation of a child, child prostitution, or other similar offenses as defined by the most current State Statutes, or similar laws of another jurisdiction. Remove from the work and work site any employee who has engaged in such actions, or who the Owner reasonable considers objectionable.
4. Without limiting the generality of the foregoing, ensure by appropriate provision in each subcontract agreement that the Contractor may remove from the work and work site any subcontractor or subcontractor's employee who has engaged in such action. At no change to the Contract Sum or Contract Time, remove from the work and work site any employee or other person pursuant to this Section. Failure to comply with these requirements is grounds for immediate termination of the Agreement for cause.
5. Subcontractors and material suppliers shall be responsible for additional requirements as indicated in the Owner-Contractor Agreement.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. Work of this Contract, referred to as Project and Work where occurs in the specifications, comprises of the replacement of the existing fiber backbone system at Crescent Valley High School of the Corvallis, Oregon School District.
- B. Work includes selective demolition and renovations to existing school to install the replacement of fiber backbone system, as indicated on the Drawings and described by the Specifications.

1.4 STANDARD WORKING HOURS/DAYS

- A. Project schedule assumes a five (5) day work week unless noted in the project contract schedule.
- B. Exterior work may be performed Monday through Friday from 7:00 a.m. through 6:00 p.m. and Saturday from 8:00 a.m. through 4:00 p.m.
- C. Interior work that does not generate noise may be performed Monday through Friday from 7:00 a.m. through 11:00 p.m. and Saturday from 7:00 a.m. through 5:00 pm with the concurrence of the District Authorized Representative.
- D. Off-hour work may be required to accommodate school operations.

- E. For any deviation from the above stated working days/times, submit a request in writing to the District at least 48 hours prior to the date in question. While the District cannot assure approval in every instance, efforts will be made to accommodate such requests.

1.5 DELEGATED DESIGN REQUIREMENTS

- A. Certain components of the Work under this project are Delegated Design. It is the Contractor's responsibility to coordinate and assume or assign to subcontractors the complete responsibilities for the design, calculation, submittals, fabrication, transportation and installation of the Delegated Design portions or components as required. Delegated Design components of the Work are defined as complete operational systems, provided for their intended use.
- B. Submit deferred submittals for delegated design elements to the governing agency for the separate approval of each Delegated Design item as defined in Section 01 3000 "Administrative Requirements".
- C. Owner shall not be responsible to pay for delays, additional products, additional hours of work or overtime, restocking or rework required due to failure by the Contractor or subcontractors to coordinate their work with the work of other trades on the Project or to provide the Delegated Design portion or component in a timely manner to meet the schedule of the Project.
- D. Delegated Design components include, but are not limited to the following:
 - 1. Where Work Occurs:
 - a. Seismic anchorage for the building structure and seismic restraints for systems in Divisions 22, 23, 26, 27 and 28.

1.6 CONTRACTOR USE OF PREMISES

- A. Work Sequence:
 - 1. Perform Work in a manner required to accommodate School District use of premises during the Contract Period. Coordinate Work schedules and operations with Owner's use requirements.
 - 2. Provide access to and from site as required by law and by Owner:
 - a. Emergency Building Exits During Construction: Keep exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 3. Do not obstruct roadways, sidewalks, or other public ways without permit.
 - 4. Keep building exits safe, protected, and restricted from remainder of construction site and clear of obstructions at all times.
- B. Limitations on Use:
 - 1. Complete and exclusive use of the construction area will not be permitted from Notice to Proceed until Substantial Completion.
 - 2. Smoking or open fires are not permitted within the building enclosure or on the Project site.

3. Do not encumber the site with materials or equipment. Confine stockpiling of materials and location of storage sheds to the areas indicated or coordinated with Owner.
4. Move stored products under Contractor's control that interfere with operations of Owner or separate contractors.

C. Contractor's Site Conduct:

1. Identifying photo name tags shall be worn at all times by Project site workers.
2. No loitering in the school buildings or unsupervised/unauthorized entry.
3. Site is tobacco- and cannabis-free. This means no smoking or chewing on school property.
4. Beyond courtesy, there should be no interaction between staff and faculty.
5. Keep project free of pop cans, lunch wrappers and similar debris.
6. Review with the Owner the scheduling of work that is excessively noisy or has the potential to disrupt activities of Owner or neighbors.
7. Be considerate of the client, the students and faculty.
8. Always consider, prior to an act, the safety of students, faculty and other co-workers.
9. Profanity is not acceptable.
10. The wearing of clothing with logos displaying alcohol, tobacco, illegal or restricted substances or suggestive themes is not acceptable attire.
11. No radios or music players allowed.

D. Non-Interference with Serving Utilities:

1. Consult with public and private utility companies for location and extent of utilities before commencing work.
2. Provide services of an utilities locator to investigate and mark underground utilities in the vicinity of exterior work; and for interior below-slab utilities in areas that will be partially demolished prior to commencing work. Ensure that utilities are identified prior to saw cutting interior floor slabs.
3. Provide all services required. Protect and maintain existing utilities, active electrical conductors, sewers, pipes, and other active lines either on Project site or in offsite street excavations.
4. Arrange for and pay cost of disconnecting, removing, relocating, capping, replacing, or abandoning of public and private utilities in the way of construction operations in accordance with serving utilities policies, local regulations and governing codes. Utilities, pipes, sewers, electrical conductors and the like to be abandoned shall be capped in accordance with instructions of governing authority or as directed.

E. Protections - Exterior Work, as Applicable:

1. Protect sidewalks, asphalt paving, concrete, plantings, and lawn areas from spillage of materials used in carrying out the Work. Exercise care to preclude materials from clogging catch basins and yard drains. Leave drainage items clean and in proper working condition.
2. Clean, repair, resurface, or restore existing surfaces to their original condition, or completely replace such surfaces to match existing where damaged by construction operations.
3. Whenever it is necessary to cut and remove fences and/or power lines (whether on private or public property), restore such demolished work to condition at minimum equal to that which existed prior to such demolition.
4. Restore damage to property adjacent to Owner's property to the satisfaction of respective property owners.

F. Protections - Interior Work, as Applicable:

1. Contractor is responsible for protection of completed portions of the Work. Provide protection as required such that items are not soiled or damaged during the progression of the Work. Maintain such protections for duration of construction until acceptance by Owner.
 - a. Provide a weathertight condition throughout the Work. Clean, repair, resurface or restore building and site components required to be protected to their original condition, or completely replace items to match existing undamaged portions of Work, where damaged by construction operations.
2. Whenever it is required and/or necessary to demolish portions of Work, take precautions to protect adjacent portions of the Work that remain from damage.
3. Keep public areas such as hallways, stairs, elevator lobbies and toilet rooms free from accumulation of waste material, rubbish or construction debris.

G. Protections: Vegetation and Plantings, where applicable:

1. Protect existing trees to remain on-site from foliage, trunk, branch, and root damage.
2. Provide barricades and maintain same around trees, plantings, and other landscaped areas adjacent to Work of this Contract to protect such areas from damage caused by construction operations.
3. Replace plantings damaged or destroyed with plants of equivalent type, size, quantity, and nature as approved by Architect.

H. Security:

1. Provide security and facilities to protect the Work and Owner's operations from unauthorized entry, vandalism, and theft.
2. Provide temporary barriers, doors, and locks at openings.
3. Lock automotive vehicles and other mechanized or motorized construction equipment when parked and unattended. Do not leave vehicles or equipment unattended with the motor running or ignition key in place.
4. Coordinate with Owner's building security provider and program.

I. Removal of Equipment and Materials:

1. Clear site and surrounding street areas of equipment, apparatus, appliances, tools, unused materials, and similar items immediately as they cease to be necessary to carry out the Work.

1.7 HAZARDOUS MATERIALS SURVEY AND ABATEMENT

- A. All work to align with Owner provided Hazardous Materials Survey Report dated January 2019 and the asbestos abatement, lead handling, removal and disposal, and air monitoring requirements furnished by PBS Engineering and Environmental Inc.
- B. Additional cost for abatement of hazardous materials discovered during course of construction work shall be brought to the attention of the Owner and fully agreed upon prior to commencing abatement work.

1.8 RELATED WORK BY OWNER OR OTHERS

- A. NIC and OFOI Items: Items designated on the Drawings and/or described in the Project Manual as "NIC" (Not In Contract) or "OFOI" (Owner Furnished, Owner Installed) are not included in the Contract.

1.9 OWNER-FURNISHED PRODUCTS

- A. OFCI Equipment and Products: Items specifically designated on Drawings or specified in the Project Manual and/or described as "OFCI" (Owner Furnished, Contractor Installed).
- B. Owner's Responsibilities for OFCI Products:
 - 1. Arrange for delivery of shop drawings, product data, samples, manufacturer instructions, and certificates to Contractor.
 - 2. Deliver supplier's bill of materials to Architect for review.
 - 3. Arrange and pay for delivery to site in accordance with Contractor's Progress Schedule.
 - 4. Inspect deliveries jointly with Contractor.
 - 5. Submit claims for transportation damage.
 - 6. Arrange for replacement of damaged, defective, or missing items.
 - 7. Arrange for manufacturer's field services; arrange for and deliver manufacturer warranties and bonds to Contractor.
- C. Contractor Responsibilities for OFCI Products:
 - 1. Designate submittals and delivery date for each product in project Progress Schedule.
 - 2. Review shop drawings, product data, samples, and other submittals. Submit to Architect with notification of any observed discrepancies or problems anticipated due to non-conformance with Contract Documents.
 - 3. Receive and unload products at work site.
 - a. Inspect deliveries jointly with Owner, record shortages and damaged or defective items.
 - b. Handle products at site including uncrating and storage.
 - c. Protect products from damage and from exposure to elements.
 - d. Assemble, install, connect, adjust, and finish products.
 - e. Provide installation inspections required by public authorities and jurisdictions.
 - f. Repair or replace items damaged by Contractor to satisfaction of Owner.
- D. Schedule of OFCI Products and Equipment: As indicated on Drawings as OFCI.
 - 1. Where required for installation, coordinate placement of accessories to meet accessibility requirements, clearance from grab bars and placement of backing.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 01 1000

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SECTION 01 2000 - PRICE AND PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Procedures for preparation and submittal of applications for progress payments.
 - 2. Procedures for preparation and submittal of application for final payment.

- B. Related Requirements:

- 1. Division 00 "Procurement and Contracting Requirements": For Contracting Forms and Supplements to be referenced and used.
 - 2. Documentation of changes in Contract Sum and Contract Time: Refer to Section 01 2600 "Contract Modification Procedures."

1.3 SCHEDULE OF VALUES

- A. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
- B. Forms filled out by hand will not be accepted.
- C. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.
- D. Format: Utilize GMP breakdown line items as agreed with Owner's representative.
- E. Revise schedule to list approved Change Orders, with each Application for Payment.
- F. Include a Construction Contingency column in the SOV for use in tracking contingency usage.

1.4 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect and Owner's Representative for approval.
- C. Forms filled out by hand will not be accepted.

D. For each item, provide a column for listing each of the following:

1. Item Number.
2. Description of work.
3. Scheduled Values.
4. Contingency Usage.
5. Authorized Change Orders.
6. Revised Schedule of Values.
7. Previous Applications.
8. Work in Place and Stored Materials under this Application.
9. Total Completed and Stored to Date of Application.
10. Percentage of Completion.
11. Balance to Finish.
12. Retainage.

E. Execute certification by signature of authorized officer.

F. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.

G. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of Work.

H. Submit one (1) digital copy of each Application for Payment.

I. Include the following with the application:

1. Construction progress schedule, revised and current as specified in Section 01 3000 "Administrative Requirements."

J. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.5 APPLICATION FOR FINAL PAYMENT

A. Application for Payment at Substantial Completion: After issuing 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.

B. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

C. Application for Final Payment will not be considered until the following have been accomplished:

1. All closeout procedures specified in Section 01 7000 "Execution".

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 01 2000

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SECTION 01 2500 - PRODUCT SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes general requirements for the Work in relation to substitutions and product options.

1.2 SUBSTITUTION PROCEDURES

- A. Substitution requests will not be considered prior to receipt of Bids unless the Architect receives a written request for approval at least seven days prior to the date for receipt of Bids. Comply with requirements specified in this Section. Requests received after that time will not be considered except as specified below under "Substitutions Requested After Award of Contract."
- B. Submit requests for substitution electronically as PDFs.
 - 1. Submit requests for substitution during the Bid Phase via email to the individual indicated in Instructions to Bidders.
 - 2. Submit requests for substitution after the Bid Phase through the Contractor. Substitution requests received directly from subcontractors or suppliers will be returned through the Contractor without review.
- C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
- D. A request for substitution constitutes a representation that the Contractor/Bidder:
 - 1. Has investigated proposed product and determined that it is equal to or superior in all respects to specified product.
 - 2. Will provide identical warranty as required for the specified product.
 - 3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
 - 5. **Will pay for changes to building design, including architectural or engineering design, detailing, construction costs, or re-approval by authorities caused by the requested substitution.**
- E. Substitutions after Award of Contract will not be considered when:
 - 1. Indicated or implied on shop drawings or product data submittals without formal request submitted in accordance with this Section.
 - 2. Submittal for substitution request has not been reviewed and recommended by Contractor. Substitution requests received directly from subcontractors or suppliers will be returned through the Contractor without review.
 - 3. Acceptance will require substantial revision of Contract Documents or other items of the Work.

4. Submittal for substitution request does not include point-by-point comparison of proposed substitution with specified product.
- F. Substitution Request Forms: Appended to This Section.
1. Prior to bidding: Substitution Request Form, For Substitution Requests Prior to Bidding.
 2. After the Bidding Phase: Substitution Request Form, For Substitution Requests During Construction Administration Phase (post-bid).
- G. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
1. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
 2. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 3. 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.
 4. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 5. Samples, where applicable or requested.
 6. Certificates and qualification data, where applicable or requested.
 7. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 8. List of availability of maintenance services and replacement materials.
 9. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 10. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
 11. 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.
 12. Cost information, including a proposal of change, if any, in the Contract Sum.
 13. 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.
 14. 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.
- H. Accepted Substitutions prior to Bid Date will be listed in Addenda published in accordance with Advertisement for Bids and the Instructions to Bidders. Bidders will not rely upon approvals made in any other manner.

- I. Architect's Action for Substitutions After Award of Contract: If necessary, Architect will request additional information or documentation for evaluation within 7 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 7 days of receipt of additional information or documentation, whichever is later.
 1. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 2. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.3 SUBSTITUTIONS REQUESTED AFTER AWARD OF CONTRACT

- A. Substitutions will normally not be considered after date listed in Instructions to Bidders, except when required due to unforeseen circumstances. Within a period of 15 days after date of Contract, the Owner may, at its option, consider formal written requests for substitution of products in place of those specified when submitted in accord with the requirements stipulated herein. To receive consideration, one or more of the following conditions must be documented in any such request:
 1. The substitution is required for compliance with final interpretation of Code requirements or insurance regulations.
 2. The substitution is required due to unavailability of a specified product, through no fault of the Contractor.
 3. The substitution is required because subsequent information disclosed the inability of the specified product to perform properly or to fit in the designated space.
 4. Manufacturer's or fabricator's refusal to certify or warrant performance of specified product as required.
 5. Subsequent information that a long delivery date will not be compatible with the Contract construction period.
 6. 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. District reserves the right to reject any and all substitution requests for any reason, without obligation or liability.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 01 2500

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SUBSTITUTION REQUEST FORM
For Substitution Requests Prior to Bidding

Advancement of Construction Technology
The Construction Specifications Institute

TO: _____

PROJECT: _____

SPECIFIED ITEM: _____

Section	Page	Paragraph	Description
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The undersigned requests consideration of the following:

PROPOSED SUBSTITUTION: _____

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

Attached data also includes description of changes to Contract Documents which proposed substitution will require for its proper installation.

The undersigned states that the following paragraphs, unless modified on attachments, are ALL correct:

1. THE PROPOSED SUBSTITUTION DOES NOT AFFECT DIMENSIONS SHOWN ON DRAWINGS.
2. THE UNDERSIGNED WILL PAY FOR CHANGES TO THE BUILDING DESIGN, INCLUDING ENGINEERING DESIGN, DETAILING AND CONSTRUCTION COSTS CAUSED BY THE REQUESTED SUBSTITUTION.
3. THE PROPOSED SUBSTITUTION WILL HAVE NO ADVERSE EFFECT ON OTHER TRADES, THE CONSTRUCTION SCHEDULE, OR SPECIFIED WARRANTY REQUIREMENTS.
4. MAINTENANCE AND SERVICE PARTS WILL BE LOCALLY AVAILABLE FOR THE PROPOSED SUBSTITUTION.

The undersigned further states that the function, appearance and quality of the Proposed Substitution are equivalent or superior to the Specified Item.

Submitted by:

For use by Design Consultant:

Signature _____

Firm _____

Address: _____

Date: _____

Telephone: _____

Attachments: _____

Accepted

Accepted as noted

Not Accepted

Received too late

By: _____

Date: _____

Remarks: _____

SUBSTITUTION REQUEST FORM
For Substitution Requests During
Construction Administration

Advancement of Construction Technology
The Construction Specifications Institute

TO: _____

PROJECT: _____

SPECIFIED ITEM:

Section	Page	Paragraph	Description
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The undersigned requests consideration of the following:

PROPOSED SUBSTITUTION: _____

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

Attached data also includes description of changes to Contract Documents which proposed substitution will require for its proper installation.

Substitutions for After Bidding: The undersigned states that the substitution is requested DUE TO AT LEAST ONE of the following conditions (indicate and substantiate condition in attachments; failure to identify one of these conditions will result in rejection of the substitution):

1. SPECIFIED PRODUCT IS NO LONGER AVAILABLE.
2. SPECIFIED PRODUCT IS NO LONGER COMPATIBLE, DUE TO CHANGES IN THE DESIGN DURING CONSTRUCTION.
3. A CHANGE IN GOVERNING REGULATORY REQUIREMENTS MAKES A REVISION IN DESIGN OR MATERIAL USAGE MANDATORY.
4. SUBSTITUTION OFFERS THE OWNER A SUBSTANTIAL ADVANTAGE IN COST, TIME, ENERGY CONSERVATION, OR OTHER CONSIDERATIONS (Provide substantiation for review).

The undersigned further states that the function, appearance and quality of the Proposed Substitution are equivalent or superior to the Specified Item.

Submitted by:

For use by Design Consultant:

Signature _____

Firm _____

Address: _____

Date: _____

Telephone: _____

Attachments: _____

Accepted

Accepted as noted

Revise and Resubmit

Not Accepted

By: _____

Date: _____

Remarks: _____

SECTION 01 2600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Procedures for processing contract modifications and Change Orders.

1.2 RELATED REQUIREMENTS

- A. Owner-Contractor Agreement: Governing requirements for changes in the Work, in Contract Cost, and Contract Time.
- B. Section 01 3000 "Administrative Requirements" for submittal procedures.
- A. Section 01 7800 "Closeout Submittals" for Project record documents, operation and maintenance (O&M) data, warranties and bonds.

1.3 SUBMITTALS

- A. Submit name of individual authorized to accept changes, and to be responsible for informing others in Contractor's employ of changes in the Work.

1.4 GENERAL REQUIREMENTS

- A. Additional work shall not be undertaken without Owner's written approval.
- B. Written approval authorizing Contractor to undertake additional Work does not authorize automatic extension of Contract Completion time.

1.5 DEFINITIONS

- A. Change Order (CO): This document executed by Owner, Contractor and Architect formally changes the Contract Sum, Contract Scope or Contract Time and incorporates Change Requests and/or Construction Change Directives.
- B. Change Request (CR): This document initiated by the Owner or Contractor is to be priced by the Contractor. Upon authorization by the Owner it becomes an instruction to the Contractor to modify the scope of the Contract for inclusion in a future Change Order.
- C. Architect's Supplemental Instructions (ASI): This form is a written order comprising instructions or interpretations, signed by Architect making minor changes in the Work not involving a change in Contract Sum or Contract Time. If the Contractor considers that the ASI constitutes a Change in the Work, it must notify the Owner in accordance with the Contract Documents.

- D. Construction Change Directive (CCD): A written order to the Contractor, by the Owner, amending Contract Documents as described. This order directs Contractor to proceed with Work that may alter Contract Sum and/or Contract Time, and is intended to be included in a subsequent Change Request pending agreement on changes in the Contract Sum and/or Contract Time. The Owner will include a not-to-exceed value for the proposed CR process in the CCD.

1.6 SIGNATURES

- A. All signatures on Change Orders and Construction Change Directives shall be original or scanned signatures. Electronically inserted signatures, electronically stamped signatures and digital signatures are not acceptable. Scanned copies of signatures are acceptable but the scan must be legible.

1.7 MODIFICATION PROCEDURES

- A. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor.
 - 1. Form for Minor Changes in the Work: Architect's "Architect's Supplemental Instructions" form.
 - 2. If Contractor determines that an Architect's Supplemental Instruction involves adjustments to the Contract Sum or Contract Time, Contractor shall prepare and issue a Change Request to the Architect and Owner for approval prior to proceeding with the Architect's Supplemental Instruction.

1.8 DOCUMENTATION OF CHANGE IN CONTRACT SUM AND CONTRACT TIME

- A. Maintain detailed records of work performed on a time and materials basis. Provide complete information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.
- B. Document each quotation for a change in cost or time with sufficient data to allow evaluation of the quotation.
- C. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
- D. Provide additional data to support computations including:
 - 1. Quantities of products, labor, and equipment.
 - 2. Taxes, insurance, and bonds.
 - 3. Overhead and profit.
 - 4. Justification for any change in Contract Time.
 - 5. Credit for deletions from Contract, similarly documented.
- E. Support each claim for additional costs, and for work performed on a time and materials basis with the following information:
 - 1. Origin and date of claim.
 - 2. Dates and times work was performed, and by whom.
 - 3. Time records and wage rates paid.

4. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
5. Follow all other requirements indicated in the Owner-Contractor Agreement.

1.9 PROPOSED CHANGE PROCEDURES

- A. For changes for which advance pricing is desired, Owner will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications. Contractor shall prepare and submit a fixed price quotation within 14 days.
 1. Form for Change Requests: Contractor's standard.
 2. Form for Fixed Price Quotation: Electronically submitted PDF to Contractor.
- B. If latent or unforeseen condition require modifications to the Contract, or if an RFI response or an Architect's Supplemental Instruction is determined to have cost or schedule impacts, Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors. Document any requested substitutions in accordance with Section 01 2500 "Product Substitution Procedures".
 1. Form for Proposal Requests: Contractor's standard.
 2. Form for Fixed Price Quotation: Electronically submitted PDF.
- C. Change Request Log: Log will be maintained by Contractor and reviewed at weekly OAC meetings. Log to include columns for:
 1. Approved Costs.
 2. Pending Costs.
 3. Anticipated Costs.

1.10 APPROVAL OR REJECTION OF CHANGE REQUEST

- A. When a proposed change is initiated through a Change Request:
 1. Submit the following in writing within seven (7) days of date on Proposal Request:
 - a. All allowable direct and indirect costs.
 - b. Schedule of Values and Unit Prices including basis for costs.
 - c. Quotation will be guaranteed for period specified in the CR beginning from signing of proposal, but, as a minimum, 30 days. If no period is specified, quotation shall be guaranteed for sixty (60) days from signing.
 - d. Proposal shall be approved by authorized person.
 - e. Failure of the Contractor to respond with pricing in a timely manner shall not be justification for claims by the Contractor of delay of the project associated with the Change.
 2. Architect and Owner will review proposal and respond in writing by one of the following:
 - a. Authorizing.
 - b. Requesting additional information.
 - c. Rejecting.

3. Authorization to proceed with Change: Owner to provide written authorization to the Contractor to undertake Work.

B. When Change is initiated by Contractor: Submit to Owner.

1. Architect and Owner review and respond in writing by one of the following:
 - a. Processing a Change Order or Proposal.
 - b. Requesting additional information.
 - c. Rejecting.
2. If Owner responds by processing a Change Request, follow procedure outlined above.
3. If additional information is requested by Owner, respond in writing within seven days of Owner's request.

1.11 DOCUMENTATION OF PROPOSALS AND CLAIMS

A. Support each lump sum proposal quotation and each unit price (not previously established) with detailed substantiating data. Clearly cross reference tracking numbers of CCDs, RFIs, CRs, etc. to allow easy identification of costs origins

1. Include as separate line items any changes related to credits to Contract Sum or Contract Time associated with not performing the originally specified Work.

B. On request, provide additional data to support time and cost computations:

1. Labor hours, number of workers, time cards and hourly rate cost justification
2. Equipment hours, make and model, number of pieces required, rental agreements and hourly rate justification.
3. Products required.
 - a. Recommended source of purchase and unit cost.
 - b. Quantities required.
4. Documented credit for Work deleted from Contract.
5. Justification citing specifics of critical path impacts per current CPM for any change in Contract Time.

C. Support each claim for additional costs, and time-and-material/force account work with documentation, as required for lump-sum proposal. Include additional information:

1. Name of Owner's authorized agent who ordered work, and date of order.
2. Dates and times work was performed and by whom.
3. Time record, summary of hours worked and wage rates paid.
4. Receipts and invoices for:
 - a. Equipment used, listing dates and times of use.
 - b. Products used, listing of quantities.
 - c. Subcontracts.

1.12 CONSTRUCTION CHANGE DIRECTIVES

- A. For changes that involve an adjustment to the Contract Sum or Contract Time, Owner will issue a document instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
 - 1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
 - 2. Promptly execute the change.
 - 3. Form for Construction Change Directives: Architect's "Construction Change Directive" form.

1.13 FIXED PRICE CHANGE ORDER

- A. Change Order shall upon Owner's Change Request and Contractor's fixed price quotation; or Contractor's request for Change Order as approved by Owner.
- B. Change Order describes Work changes, additions and deletions, with attachments of authorized Proposal Requests, agreed Construction Change Directives and/or previously agreed upon change pricing or Contract Time modifications.
- C. Change Order shall provide accounting of any Contract Sum and Contract Time adjustment.

1.14 UNIT PRICE CHANGE ORDER

- A. For pre-determined unit prices and quantities, Change Order will be executed on a fixed price basis.
- B. For unit costs or quantities of units of work which are not predetermined, execute Work under a Construction Change Directive. Changes in Contract Sum or Contract Time will be computed as specified for a time and material Change Order.

1.15 TIME AND MATERIAL NOT-TO-EXCEED CHANGE REQUEST

- A. Submit itemized account and supporting data daily during the course of the Work.
- B. Owner will determine the change allowable in Contract Sum and Contract Time as provided in the General Conditions of the Contract.
- C. Maintain and provide detailed records of work done on a time and materials basis and submit verified records at the end of each day to the Owner for review and acceptance.

1.16 EXECUTION OF CHANGE ORDERS

- A. Change Orders will be issued for approval of parties as provided in General Conditions.
 - 1. Form for Change Orders: "Change Order" form.
- B. Fully executed forms for CCDs or Change Requests authorize Contractor to proceed with Change.

- C. Promptly sign and date Change Order or provide detailed written and signed statement detailing reasons if refusing to sign. If the Contractor does not sign and return the Change Order, all aspects will be considered disputed, and Contractor shall not be paid on any Work on it.

1.17 DISTRIBUTION

- A. Owner will distribute one electronic copy to Architect and Contractor for review.
- B. Change Orders: Upon authorization, all parties will sign originals with original or original scanned signatures.
 - 1. Project procedures for distribution will be discussed and agreed upon at the preconstruction meeting.
 - 2. All parties will receive fully executed digital copies of the Change Order for record.
- C. Construction Change Directives: Upon authorization, Owner will initiate CCD process which will include acceptance steps by Architect and Contractor.
 - 1. Directive describes Work Change additions or deletions, with attachments of revised Contract Documents.

1.18 CREDIT AMOUNT TO CONTRACT SUM - INSURANCE

- A. If a Change Order or Construction Change Directive results in a reduction of the Contract Sum, the Owner shall be entitled to a credit that includes the amount of the value of bond premium and amounts charged for additives for insurance premium and any other allowable markups.

1.19 CORRELATION OF CONTRACTOR SUBMITTALS

- A. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item. Adjust Contract Sum as shown on Change Order.
- B. Promptly revise Progress Schedule to reflect any changes in Contract Time, revise subschedules to adjust times for other items of work affected by the change, and resubmit.
- C. Promptly enter changes in Project Record Documents.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 01 2600

SECTION 01 3000 - ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Contractor's coordination.
- B. Electronic document exchange service.
- C. Prebid conference.
- D. Preconstruction meeting.
- E. Progress meetings.
- F. Preinstallation conferences.
- G. Project closeout conference.
- H. Requests for information (RFI).
- I. Submittals for review, information, and project closeout.
- J. Number of copies of submittals.
- K. Deferred submittals.
- L. Submittal procedures.
- M. Product submittals detailed requirements.
- N. Timing of submittals.
- O. Construction progress schedule.
- P. Schedule of values.

1.2 RELATED REQUIREMENTS

- A. Section 01 1000 "Summary": Delegate design requirements.
- B. Section 01 3200 "Construction Progress Documentation": Form, content and administration of schedules.
- C. Section 01 4000 "Quality Requirements": Testing Laboratory Reports and Manufacturer's Field Services.
- D. Section 01 6000 "Product Requirements": Contractor's list of Products.

- E. Section 01 7000 "Execution": Additional coordination requirements.
- F. Section 01 7800 "Closeout Submittals": Project record documents.

1.3 CONTRACTOR'S COORDINATION

- A. Coordinate Work of personnel, requirements and Work specified throughout the Contract Documents, including Work performed by subcontractors and suppliers.
- B. Coordinate scheduling, submittals, and the work of the various Sections of the Specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- C. Contractor's work and responsibilities include, but are not limited to, the following:
 - 1. Provide all labor, materials, equipment, delivery, tools, machines, facilities, and services necessary for the proper execution of the Work.
 - 2. Coordinate scheduling, submittals and Work of the various Sections of Specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
 - 3. Ensure that notification to and inspections by permitting agencies and 3rd party testing and inspection firms are completed in a timely fashion.
 - 4. Coordinate utility outages with a minimum of 72 hours advance notice to Owner.
 - 5. Store, protect, and secure materials, on and off site.
 - 6. Supervise and coordinate after hours work.
- D. The separation of portions of the Work into particular divisions of the specifications or sections of the drawings may not in every case conform to the categories of work typically subcontracted to particular crafts or trades. Inform bidders, subcontractors, crafts and trades that work assigned to them may be contained in sections other than customary. In every case, provide and coordinate at no additional cost to Owner, all work required in the Contract Documents.
- E. Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, all such equipment.
- F. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for piping, ductwork, and conduit as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
 - 1. The Architect may make minor adjustments in fixture, outlet, grille, louver, access hatch or ventilator locations prior to rough-in work with no additional cost.
- G. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish construction and components.
- H. Coordinate completion and cleanup of Work of separate Sections in preparation for Substantial Completion and for portions of Work designated for Owner occupancy.

- I. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner activities.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 ELECTRONIC DOCUMENT EXCHANGE SERVICE (PROCORE)

- A. All documents transmitted for purposes of administration of the contract are to be in electronic Portable Document Format- (PDF-) type files and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email. This service is provided and paid for by the Owner.
 1. Besides submittals for review, information, and closeout, this procedure applies to submittal schedule, Requests for Information (RFIs), progress documentation, contract modification documents (e.g. Supplementary Instructions, Change Requests, Change Orders, Construction Change Directives), Applications for Payment, Field Reports and Meeting Minutes, substitution requests and any other document any participant wishes to make part of the project record or as required by the Owner.
 2. Contractor and Architect are required to use this service.
 3. It is Contractor's responsibility to submit documents in PDF-type file format.
 - a. Name PDF-type files for product submittals is indicated under "Product Submittals - Detailed Requirements" Article.
 4. Subcontractors, suppliers, Architect, and Architect's consultants will be permitted to use certain modules available at no extra charge.
 5. Users of the service need an email address, Internet access, and PDF-type file review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
 6. Paper document transmittals will not be reviewed; emailed PDF documents will not be reviewed.
 7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.
- B. Training: One, one-hour training session will be arranged for all participants, with representatives of Architect, Architect's Consultants and Contractor participating; further training is the responsibility of the user of the service.
- C. Project Closeout: Coordinate with Architect and Owner to verify that archive documents have been saved and remain accessible to Architect and Owner prior to terminating the service for the project.

3.2 PRECONSTRUCTION MEETING

- A. The Owner, where requested, will schedule a preconstruction conference before the start of construction, at a time convenient to the Owner, Contractor and the Architect. The conference will be held at the Project Site or another convenient location. The meeting shall be conducted to review general issues of responsibilities, communications, and contract administration procedures.
- B. Attendance Required:
 - 1. Owner.
 - 2. Architect.
 - 3. Contractor.
 - 4. Contractor's Superintendent.
 - 5. Major Subcontractors.
 - 6. Major Suppliers when requested; others as appropriate.
- C. Agenda:
 - 1. Status of the Contract, bonds, insurance or other contract requirements.
 - 2. Status/timing of Notice to Proceed.
 - 3. Distribution of Contract Documents.
 - 4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
 - 5. Designation of personnel representing the parties to Contract and Architect.
 - 6. Contract administration responsibilities, communications and procedures.
 - 7. Project management communications and requirements.
 - 8. Tentative Contractor's construction schedule.
 - 9. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 - 10. Scheduling.
 - 11. Related work by Owner and coordination with Contractor.
 - 12. Use of premises and ongoing facility operations.
 - 13. Review of existing conditions.
 - 14. Hazardous materials.
 - 15. Owner's requirements.
 - 16. Working hours, site access and parking.
 - 17. Contractor's site mobilization and storage areas.
 - 18. Material and equipment deliveries.
 - 19. Maintaining good neighborhood relations and achieving noise, storm water, erosion and dust control.
 - 20. Construction facilities and controls.
 - 21. Temporary storage.
 - 22. Security and housekeeping procedures.
 - 23. Special inspection, testing and quality control, including procedures for testing.
 - 24. Procedures for maintaining record documents.
 - 25. Requirements for start-up of equipment and Commissioning.
 - 26. Inspection and acceptance of equipment put into service during the construction period.
 - 27. Status of permits.
 - 28. Progress meeting schedule date and time.
 - 29. Review of Contract Documents and outstanding questions related thereto.

- D. Owner will record minutes and distribute copies within two working days after meeting to participants, with copies to all participants, and those affected by decisions made.

3.3 PROGRESS MEETINGS

- A. Progress meetings will be conducted at the Project Site on a weekly basis, or at intervals otherwise agreed to. The schedule of the meetings shall be established by mutual consent of the Owner, Architect and Contractor. No changes to said schedule shall be made without mutual consent of the same parties. Coordinate preparation of the payment request with dates of meetings.
 - 1. Notify subcontractors and other representatives of scheduled meetings where their attendance is requested.
- B. Contractor will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendees: In addition to representatives of the Contractor, Owner and the Architect, other individuals concerned with current progress or coordination may be represented at these meetings. Participation by subcontractors shall be limited to attendance only when required when a prearranged topic relating to the specific trade or supplier requires their attendance at the meeting.
 - 1. Persons designated by the Contractor to attend and participate shall have all required authority to commit the Contractor to solutions as agreed upon in the meeting.
- D. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of Work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems that impede, or will impede, planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Status of RFI's, ASI's, Proposal Requests, CCD's, and Change Orders.
 - 7. Review of off-site fabrication and delivery schedules.
 - 8. Site access, utilization, and parking.
 - 9. Problems from or affecting occupants or neighbors.
 - 10. Permitting and agency issues.
 - 11. Quality/inspection issues.
 - 12. Maintenance of progress schedule:
 - a. Review progress since the last meeting.
 - b. Distribute Contractor's three-week look ahead schedule.
 - c. Evaluate current activity is in relation to the Contractor's Schedule.
 - d. Identify in advance potential delays involving submittals, material and equipment procurement, approvals, Owner-furnished materials, or separate contracts, if any.
 - e. Determine how construction behind schedule will be expedited, securing commitments from parties involved to do so.
 - f. Determine whether a recovery schedule is required for the Contractor's Construction Schedule to insure completion within the contract time.
 - 13. Coordination of projected progress.
 - 14. Maintenance of quality and work standards.

15. Effect of proposed changes on progress schedule and coordination.
16. Pay Application review at monthly interval.
17. Review of Project Record Documents, both field sets and electronic forms.
18. Contractor's update of status of OCIP enrollment by project participants.
19. Other business relating to Work.

E. Contractor shall record minutes and distribute copies within three working days after meeting to participants, with one copy to each participant and those affected by decisions made.

1. Minutes shall number topics in a manner that reflects when each topic was first raised.
2. Each topic shall reflect who is responsible for acting on the topic and date by which resolution is required.
3. No topic shall be dropped from the minutes until the method of resolution is recorded.

3.4 PREINSTALLATION CONFERENCES

A. When required in individual Specification Sections, convene a preinstallation conference at work site prior to commencing work of the Section.

1. Additional conferences may be conducted as required for performance of the Work.

B. Attendees: The Installer and representatives of manufacturers and fabricators, sub-contractors, Contractor, Owner's representative and Owner's special inspector involved in or affected by the installation, and its coordination or integration with other materials and installations, shall attend the meeting. Advise the Architect of scheduled meeting dates.

C. Notify Architect and Owner minimum four working days in advance of meeting date.

D. Agenda: Review the progress of related construction activities, including drawing and specification requirements for the following:

1. Shop Drawings, Product Data, quality-control samples, and other required submittals.
2. Time schedules.
3. Weather limitations.
4. Manufacturer's recommendations.
5. Warranty requirements.
6. Acceptability of substrates.
7. Quality, inspection, and testing requirements.
8. Assessment of risk.

E. Review conditions of installation, preparation and installation procedures, and coordination with related work.

F. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.

G. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.

- H. 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.

3.5 PROJECT CLOSEOUT CONFERENCE

- A. Request a meeting to discuss the requirements for project closeout.
- B. Attendees: In addition to representatives of the Contractor, Owner and the Architect, other individuals concerned with project closeout may be represented at these meetings.
- C. Agenda:
 - 1. Preparation of record documents.
 - 2. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
 - 3. Submittal of written warranties.
 - 4. Requirements for preparing operations and maintenance data.
 - 5. Requirements for demonstration and training.
 - 6. Preparation of Contractor's punch list.
 - 7. Completion time for correcting deficiencies.
 - 8. Inspections by authorities having jurisdiction.
 - 9. Certificate of occupancy and transfer of insurance responsibilities.
 - 10. Partial release of retainage.
 - 11. Preparation for final field observation.
 - 12. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
 - 13. Submittal procedures, including for the following:
 - a. Project Record Documents.
 - b. Operating and maintenance documents.
 - c. Final commissioning documentation.
 - d. Warranties and bonds.
 - e. Affidavits.
 - f. Turnover of extra materials and spare parts.
 - 14. Owner's partial occupancy requirements.
 - 15. Installation of Owner's furniture, fixtures, and equipment.
 - 16. Responsibility for removing temporary facilities and controls.
 - 17. Final cleaning.
 - 18. Contractor's demobilization of site.
 - 19. Maintenance.
- D. Owner will record meeting minutes.

3.6 REQUESTS FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, prepare and submit an RFI in the form specified.
1. RFIs shall originate with Contractor. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
 2. Limit topics on each RFI to a single topic to expedite response.
 3. Coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's work or work of subcontractors.
 4. Endeavor to answer all RFI's from subcontractors. Only RFI's the Contractor cannot answer shall be submitted through, reviewed by, numbered sequentially by and signed by the Contractor prior to submittal to the Architect.
 5. If Contractor disagrees with Architect's response to Contractor's RFI, Contractor shall notify Architect within three (3) calendar days of receipt of response. Lack of such notification shall be understood to mean that Contractor agrees with response.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
 2. Date.
 3. Name of Contractor.
 4. RFI number, numbered sequentially.
 5. RFI subject.
 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. Reason for need for interpretation.
 10. List of subcontractors involved.
 11. Contractor's suggested resolution. If the proposed solution impacts the Contract Time or the Contract Sum, state the impact in the RFI.
 12. The following statement:
 - a. "This reply is not an authorization to proceed with work involving additional cost, time or both. If any reply requires a change to the Contract Documents, a Change Order or Construction Change Directive must be executed in accordance with the Contract Documents prior to implementation of the reply. Proceeding with the Work in accordance with this RFI response indicates Contractor's acknowledgement that there will be no change in the Contract Sum or Contract Time."
 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings and other information necessary to fully describe items needing interpretation.
- C. RFI Forms: Contractor's software-generated form with the content specified and as acceptable to the Architect.

- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow an average 5 working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs will be returned without action:
 - a. Requests for approval of substitutions.
 - b. Requests for adjustments in the Contract Time or the Contract Sum.
 - c. Requests for interpretation of Architect's actions on submittals.
 - d. Incomplete RFIs or inaccurately prepared RFIs.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Request according to Section 01 2600 "Contract Modification Procedures".
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Owner in writing within the time stipulated in the Contract.
 - b. A response to an RFI is not direction or approval of a change to either Contract Time or Contract Sum.
 - c. Proceeding with the Work in accordance with an RFI response, without such written notification and an approved Change Order or Construction Change Directive, indicates Contractor's acknowledgement that there is no change to the Contract Time or the Contract Sum.
- E. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven calendar days if Contractor disagrees with response.
- F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit the RFI Log at each Project Meeting. Include the following:
1. RFI number including RFIs that were dropped and not submitted.
 2. RFI description.
 3. Date the RFI was submitted.
 4. Date Architect's response was received.
 5. Identification of related Minor Change in the Work, Construction Change Directive, Change Order and Proposal Request, as appropriate.

3.7 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
1. Product data.
 2. Shop drawings.
 3. Samples for selection.
 4. Samples for verification.

- B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents. Architect will coordinate with Owner for their input as necessary without extending agreed upon response time.
- C. Samples will be reviewed only for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with Submittal Procedures article below and for record documents purposes described in Section 01 7800 "Closeout Submittals".

3.8 DEFERRED SUBMITTALS

- A. For delegated design elements defined in Section 01 1000 "Summary," submit deferred submittals in accordance with the specified requirements and in accordance with Section 107.3.4.2 of the Oregon Structural Specialty Code (OSSC). Follow City of Corvallis requirements current at the time of submission.
- B. Submission will include the following, as a minimum, in quantities as required by the City:
 - 1. Drawings showing all members, sizes, fastener information, where applicable, dimensions, connections, materials used and how attached to the main structure.
 - 2. Calculations, including criteria, design assumptions, substantiating computations, and such additional data sufficient to show compliance with Code.
 - 3. Product information.
 - 4. Drawings and calculations must be stamped and signed by an Engineer registered in Oregon and must have Architect/Engineer of record's submittal review stamp.
- C. Architect or Engineer, as applicable, will review delegated design submittals, and, if the submittal is acceptable and receives a "No Exceptions Taken" or "Make Corrections Noted" action, will forward to the Contractor who will then submit the documents to the building official with annotation indicating that the deferred submittal documents have been reviewed and that they have been found to be in general conformance with the design of the building.
- D. The Architect's and Engineer's approval is contingent upon approval of submittal by governing authorities.
- E. Contractor shall be responsible for submission to the governing agency and for coordinating with the governing agency for timely review and approval of the submittals. Architect and Owner will not be responsible for delays due to failure of the Contractor to submit with adequate time allowance for agency review of the submittals.
- F. The deferred submittal items shall not be installed until their design and submittal documents have been approved by the building official.
- G. Contractor is responsible for obtaining written approval from governing authority for all Deferred Submittals.
- H. Contractor is responsible for obtaining and costs associated with applicable permits for delegated design elements as required by governing authority.

3.9 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 - 1. Design data.
 - 2. Certificates.
 - 3. Test reports.
 - 4. Inspection reports.
 - 5. Manufacturer's instructions.
 - 6. Manufacturer's field reports.
 - 7. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator for Owner. No action will be taken.

3.10 SUBMITTALS FOR PROJECT CLOSEOUT

- A. When the following are specified in individual sections, submit them at project closeout, in accordance with Section 01 7800 "Closeout Submittals":
 - 1. Project record documents.
 - 2. Operation and maintenance data.
 - 3. Warranties.
 - 4. Bonds.
 - 5. Other types as indicated.
- B. Submit for Owner's benefit during and after project completion.

3.11 NUMBER OF COPIES OF SUBMITTALS

- A. Documents: Submit one electronic copy in PDF format; an electronically marked-up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
 - 1. After review, produce duplicates.
 - 2. Retained samples will not be returned to Contractor unless specifically so stated.

3.12 SUBMITTAL PROCEDURES

- A. Transmit each submittal with a copy of approved submittal form.
- B. Submit Schedule of shop drawings, product data, and samples as specified in each individual Section of the Project Manual. Include submittal and installation dates of each product and assembly. Coordinate with construction schedule and allow ample time, but in no case fewer than 5 working days, for Architect's review. Allow time for possible disapproval, correction, and resubmittal.

- C. Submit submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 - 1. Provide a separate PDF for each submittal element (Product Data, Shop Drawings, etc.) for each specification Section.
 - a. Submit all elements for any Section as a single submittal at the same time.
 - b. Do not combine submittals for multiple specification Sections, unless previously approved by the Architect.
 - 2. Number submittals as indicated in Product Submittals - Detailed Requirements Article.
 - 3. No secure PDFs allowed.
 - 4. Incomplete submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- D. Identify Project, Contractor, subcontractor or supplier, pertinent drawing and detail number, and specification section number, as appropriate on each copy.
- E. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents prior to submission.
 - 1. Architect will not accept or process submittals which do not have Contractor's signed stamp that reflects Contractor's review and approval.
 - 2. Submission of submittal by Contractor represents that Contractor has fully reviewed and certified acceptance.
- F. Submit submittals to Architect as indicated in Electronic Document Exchange Service Article above.
- G. Schedule submittals to expedite the Project, and coordinate submission of related items.
- H. Do not fabricate products or begin work which requires submittals prior to return of submittal with Architect acceptance.
- I. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.
 - 1. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by Architect's review of submittals unless Contractor notates specific deviations and the deviations are specifically approved by the Architect.
- J. Provide space for Contractor and Architect review stamps.
- K. When revised for resubmission, identify all changes made since previous submission.
- L. Submittals not requested will be returned without review.
- M. Contractor is responsible for timely and efficient submittals and the correctness of the documentation submitted. Costs associated with multiple reviews of submittal information beyond one re-submittal (if any) shall be the responsibility of the Contractor.

- N. The Contractor is responsible for timely submittals of any required deferred submittals to the governing agencies.

3.13 PRODUCT SUBMITTALS - DETAILED REQUIREMENTS

- A. Present in a clear and thorough manner. Title each drawing with Project Name.
- B. Identify field-verified dimensions; show relation to adjacent or critical features of Work or products.
- C. Number submittals by submittal section number, followed by a two-letter designation for the type of submittal and a number which sequentially numbers submittals in order submitted to Architect. For example, the initial submittal of Joint Sealers per the requirements of Section 07 9200 "Joint Sealants", Product Data would be designated 07 9200-PD-1. If the submittal must be resubmitted it shall be identified as 07 9200-PD-1R1 and subsequent resubmittal shall be sequentially numbered in order as resubmitted.
- D. Product Data (PD):
1. Submit only pages which are pertinent; mark each copy of standard printed data to identify pertinent products, referenced to Specification Section and Article number.
 2. Modify manufacturer's standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the Work. Delete information not applicable.
 3. Product data that has not been marked to indicate the applicable information will be returned without review.
 4. Contractor shall assemble Product Data required for maintenance manuals and submit to Architect in accordance with Section 01 7800 "Closeout Submittals".
- E. Shop Drawings (SD):
1. Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproduction of the Contract Documents or standard printed data.
 2. Fully illustrate requirements in the Contract Documents including, but not limited to:
 - a. Identification of products.
 - b. Compliance with specified standards.
 - c. Notation of coordination requirements.
 - d. Notation of dimensions established by field measurement.
 - e. Relationship and attachment to adjoining materials or assemblies, relevant field conditions and all necessary dimensions.
- F. Samples (SA):
1. Samples for Initial Selection: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected. Architect will retain selected sample for confirmation of subsequent submittals.
 2. Submit samples to illustrate functional characteristics of products, including parts and attachments.

3. Approved samples which may be used in the Work are indicated in the individual Specification Sections.
4. Label each sample with identification required for transmittal letter.
5. Verification Samples: Submit the number of samples specified in individual Specification Sections. One of which will be retained by the Architect.
 - a. Submit three copies if no number is indicated.
 - b. Submit additional samples when copies will be required for distribution to other subcontractors or fabricators for matching or preparation of finish samples.
6. Provide field samples of finishes at project site, at location acceptable to Architect, as required by individual Specifications Section. Install each sample complete and finished. Acceptable finishes in place may be retained in completed work if approved by Architect.

G. Manufacturer's Instructions (MI):

1. Provide at Minimum: Manufacturer's instructions for storage, preparation, assembly, installation, start-up, adjusting, balancing, and finishing in accordance with Section 01 4000 "Quality Requirements".

H. Manufacturer's Certificates (MC):

1. When specified in individual Specification Sections, submit manufacturers' certificate to Architect/Engineer for review, in quantities specified herein.
2. Indicate material or product in conformance with or exceeding specified requirements. Submit supporting reference date, affidavits, and certifications as appropriate.
3. Certificates may be recent or previous test results on material or Product but must be acceptable to Architect.

3.14 TIMING OF SUBMITTALS

A. General:

1. The listing of submittals hereinafter is set forth as a checklist for Contractor's convenience and is general in nature.
2. Architect reserves the right to add to this list in case of omission of any submittals specified in other Sections but not listed hereinafter.

B. Submittals - Within Thirty Calendar Days Following Notice-to-Proceed and Prior to First Payment Application:

1. Schedule of values; submit at least 10 working days in advance of application.
2. Schedule of submittals.
3. Copies of acquired and unacquired building permit licenses etc. to complete the Work of the Contract. Submit copies of any remaining permits as they are acquired.
4. Construction schedule.

C. Submittals - Prior to Each Month's Progress Payment:

1. Submit 10 working days in advance of date established for progress payment.
2. Application and Certificate for Payment (Owner's Payment Application form).

3. Notarized affidavit of payments to all subcontractors and major material suppliers (see application for payment).
4. Updated Construction Schedule.
5. Public Works Contractor Wage Certification per Oregon Law.

D. Submittals - Prior to Request for Substantial Completion:

1. Notification to Architect that Work of the Project is substantially complete.
2. Itemized listing of items of work to be completed or corrected.
3. Submit Certificate of Occupancy or Occupancy Permit issued by the Local Building Department for the entire Project.
4. Draft Operations and Maintenance Manuals and draft warranties.

E. Submittals - Prior to Request for Final Completion:

1. Certified copy of punchlist items completed.
2. Submit final Application for Payment.
3. Summary of commissioning indicating all required items are completed.
4. Demonstration and Training; training reports.
5. Final complete and correct Operations and Maintenance Manuals.
6. Record Drawings of Contract Documents with all changes indicated.
7. Final dated and signed Warranties.

3.15 CONSTRUCTION PROGRESS SCHEDULE

- A. Submit initial progress schedule as required in Section 01 3200 "Construction Progress Documentation".
- B. Revise and resubmit as required.
- C. Review revised schedules with each Application for Payment, identifying changes since previous version.
- D. See Section 01 3200 "Construction Progress Documentation" for specific requirements.

3.16 SCHEDULE OF VALUES

- A. Submit typed schedule on Owner's Payment Application form. Contractor's standard form or media-driven printout will be considered on request.

END OF SECTION 01 3000

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ELECTRONIC MEDIA AGREEMENT

Contractor and Subcontractor ("Recipient") have requested that the Architect provide to it certain plans, specifications and other documents in electronic form ("Electronic Form Documents"), for this project and the Architects will do so. The Recipient recognizes that Electronic Form Documents are not intended to be used for construction, are not Contract Documents under the terms of the Construction Contract, may be revised by others without the knowledge or consent of the Architect and, when plotted, may result in variances or corrupt other files of the user.

The Recipient agrees that the Electronic Form Documents will only be used for general reference only. The Recipient also agrees not to use the Electronic Form Documents as shop drawings or submittals or for any project other than the Project for which they were prepared.

The Recipient acknowledges that the Electronic Form Documents are the property of the Architect and subject to the copyright of the Architect. The Electronic Form Documents may be write-protected by the Architect such that no data on such disk can be manipulated. The Architect will provide to the Recipient only a working copy of Electronic Form Documents. Said working copy of the Electronic Form Documents shall have all indices of the Architect's ownership, professional name, and/or involvement in the Project removed from the electronic display.

Any use of any kind and/or changes to the Electronic Form Documents will be at the sole risk of the user, and without liability, risk or legal exposure to the Architect. The Recipient and any other person or entity using the Electronic Form Documents agrees to release and, to the fullest extent permitted by law, defend and indemnify the Architect, its consultants, and their partners, shareholders, agents and employees from and against any and all claims, demands, losses, expenses, damages, penalties and liabilities of any kind, including without limitation, attorney's fees, arising out of or relating in any way to any such use of or change to the Electronic Form Documents.

Under no circumstances shall the Architect deem the transfer of the Electronic Form Documents for use of the Recipient a sale, and the Architect makes no warranties, either expressed or implied, of merchantability and fitness for any particular purpose.

The Recipient agrees, as a condition of forwarding the Electronic Form Documents to any other person or entity, to require such third party to agree in writing to the terms and conditions of this Agreement concerning use of the Electronic Form Documents.

Dated this _____ day of _____, 20____

_____ (Contractor)

By: _____

SECTION 01 3113 - PROJECT COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural instructions for project coordination.
- B. The Contractor shall use their best skill and attention to coordinate all aspects of the Project and plan the Work in advance of execution to achieve each of the following objectives listed below. The Owner is responsible to compensate the Contractor neither for costs nor lost time incurred due to Contractor's failure to meet the objectives required for Project Coordination.
 - 1. The Contractor shall anticipate and thereby prevent circumstances that could necessitate the need for alteration of work following execution.
 - 2. Avoid the need for alteration of existing work not documented in the Contract.
 - 3. Avoid alteration of new work once it has been executed.
 - 4. Avoid sequencing of installation that may affect the performance of the building enclosure and weathertightness.
 - 5. Expedite progress so as to complete the Work within the Contract Time or in advance of scheduled milestones.
 - 6. Prevent conflicts among the various trades engaged in the Work.
- C. When notified by the Owner's representative the Contractor shall provide for the occurrence of work by other prime contractors at the Project site over the course of the Work. Such work may affect site and building access, utilities, and other aspects of the Project. Coordinate the Work and adapt sequence and staging as necessary to accommodate work by other prime contractors and work by the Owner. Periodically during the Work consult the Owner's representative for information on current projects
 - 1. Owner installation of furniture and equipment.
 - 2. Construction in adjacent facilities.
- D. Submittals: General coordination memoranda, drawings, diagrams and schedules, for the coordinated control and utilization of the site, from beginning of construction activity through project close-out and warranty periods
 - 1. Non-standard Conditions Report: Describe condition, location and suggested remedial measures.
 - 2. Coordination Drawings.
- E. Related Requirements.
 - 1. Section 01 1000 "Summary."

2. Section 01 3216 "Construction Progress Documentation."
3. Section 01 6000 "Product Requirements."
4. Section 01 7000 "Execution."
5. Section 01 7419 "Construction Waste Management and Disposal."

1.3 CONSTRUCTION ORGANIZATION AND START-UP

A. Establish on-site lines of authority and communications including the following:

1. Establish procedures of intra-project communications including:
 - a. Submittals.
 - b. Reports and records.
 - c. Recommendations.
 - d. Coordination Drawings.
 - e. Schedules.
 - f. Resolution of conflicts.
2. Contract Documents Interpretation:
 - a. Consult with Architect to obtain interpretation.
 - b. Assist in resolution of questions or conflicts which may arise.
 - c. Transmit written interpretations to Subcontractors and to other concerned parties.
3. Permits and Approvals: Verify that subcontractors have obtained required permits and inspections for work and for temporary facilities.
4. Control Use of Site:
 - a. Supervise field engineering and project layout.
 - b. Allocate field office space and work and storage areas for use of each subcontractor.
 - c. Schedule, coordinate, and facilitate combined efforts of Engineer of Record and mechanical and electrical subcontractors to achieve Design Assist of mechanical and electrical systems.
 - d. Develop a pre-fire protection plan to be maintained on-site and provided to the building or fire code official upon request.

1.4 COORDINATING SUBCONTRACTORS' WORK

- A. Coordinate the work of all subcontractors and make certain that, where the work of one trade is dependent upon the work of another trade, the work first installed is properly placed, installed, aligned, and finished as specified or required to properly receive subsequent materials applied or attached thereto.
- B. Direct subcontractors to correct defects in substrates they install when subcontractors of subsequent materials have a reasonable and justifiable objection to such surfaces.
- C. Do not force subcontractors to apply or install product to improperly placed or improperly finished substrates that would result in an unsatisfactory or unacceptable finished product.

- D. When the work of a subcontractor is critical to the Project schedule, coordinate the reasonable efforts of that subcontractor to ensure adherence to the schedule, including added labor, materials, equipment, tools, construction, equipment, machinery, or other facilities as necessary to accelerate the construction.

1.5 COORDINATING WORK WITH OWNER'S WORK AND OTHER CONTRACTOR'S WORK

- A. Coordinate and make certain that where work of either party is dependent upon the other party, the work first performed is properly placed, installed, aligned, and finished as required to permit the proper installation of the following work.
- B. If the other work in any way interferes with the Contractor's work so notify the other party sufficiently in advance so that the other party has reasonable time to make necessary adjustments.
- C. If the Contractor's work in any way interferes with the other party's work, so notify the other party as soon as possible. The Contractor shall modify its schedule as reasonably necessary to accommodate the other party's work.

1.6 COORDINATION DRAWINGS

- A. The Contractor shall provide for participation by representatives of each of the trades or entities involved in the execution of work to be documented by the coordination drawings, where required, who shall be knowledgeable of all the requirements for the Work and fully authorized to act on behalf of the entity or firm they represent. Coordination drawings are not limited to shop drawings required in individual specification sections.
- B. Comply with Shop Drawing requirements where shop drawings serve as coordination drawings between trades.
- C. Coordination meetings for coordination drawing review shall be held at regularly scheduled intervals appropriate to the status of the Work and sufficiently in advance of execution to avoid the need for modifications to work already in place and prevent any delay in progress.
- D. Review shop drawings and coordination drawings prior to submission to Architect.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Contractor shall notify Owner of conditions created and uncovered during the Work that may complicate completion of subsequent work. Such conditions include but are not limited to substrate profile, coatings, integrity, voids and protrusions and other conditions. Report non-standard and potentially problematic conditions in writing, and suggest remedial measures.

- B. Contractor: Responsible for knowing the general character of each item of new work to be installed in areas where Work is performed and, understand the standard conditions and substrate characteristics for proper installation of the new work.
1. Utilize coordination drawings and field verification of dimensions and measurements to ensure mechanical, plumbing, electrical and other building systems and equipment are coordinated with building structure and architectural features. Verify physical dimensions of equipment with the space available and ensure necessary clearances exist for execution, operation and maintenance.
 2. Manufacturer's Instructions: Where new work will include manufactured products, inspect manufacturer's instructions and recommendations for installation. Provide conditions complying with the manufacturer's recommendations.

END OF SECTION 01 3113

SECTION 01 3200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Preliminary baseline schedule.
- B. Final construction baseline schedule.
- C. Progress reports.
- D. Material location reports.
- E. Field condition reports.
- F. Special reports.

1.2 REFERENCES

- A. AGC (CPSM) - Construction Planning and Scheduling Manual; Associated General Contractors of America.

1.3 SUBMITTALS

- A. Preliminary Baseline Schedule: Within 14 calendar days after date of Owner's Notice of Intent to Award the Contract, submit preliminary baseline schedule defining planned operations for the entire scope of Work.
 - 1. Hard copies of the schedule will be available upon request.
 - 2. If preliminary baseline schedule requires revision after review, submit revised schedule within 10 working days.
 - 3. The data date is to be set to Notice of Award.
- B. Final Construction Baseline Schedule: Within 30 calendar days after date established in Notice to Proceed, submit draft of proposed complete schedule for review.
 - 1. Include written certification that mechanical and electrical Subcontractors have reviewed and accepted proposed schedule.
 - 2. Neither Owner nor Architect shall be responsible for review of the entire substance of the Progress Schedule.
 - 3. Submit updated schedule with each Application for Payment.

4. At each progress meeting, submit the following:
 - a. Weekly Progress Schedule: Once the Final Baseline Schedule has been approved, the Data Date will be advanced. The Data Date will be set to the Monday of each week at the start time (08:00 if work starts at 8:00). Data Date is to be advanced weekly throughout the duration of the project. Prepare a three-week look-ahead schedule listing current and upcoming activities by trade, including anticipated start and complete dates as applicable.
5. Submit the following at the end of each month:
 - a. Monthly Progress Schedule: The last weekly update in a month will be submitted as the Monthly Progress Schedule. Coordinate with the Owner as to which weekly progress schedule to use if the start or end of the month falls on an unusual day of the week.
- C. Progress Reports: Submit at weekly intervals.
- D. Field Condition Reports: Submit at time of discovery of differing conditions.
- E. Special Reports: Submit at time of unusual event.

1.4 QUALITY ASSURANCE

- A. Scheduling Kick-Off Meeting: Within 7 calendar days of receipt of Owner's Notice of Intent to Award, coordinate with Owner to schedule a Scheduling Kick-Off Meeting. The purpose of the meeting is to:
 1. Discuss implementation of the Contractor's schedule.
 2. Review project scheduling requirements.
 3. Memorialize any acceptable deviations from requirements.
- B. Scheduler: Designate a person or firm for managing the CPM schedule and database. This includes preparation, revisions, updating, and required submittals. The Project Scheduler shall be approved by the Owner based on a resume indicating as a minimum 4 years of experience with CPM schedules on construction projects of similar size and complexity. The Owner may reject the Project Scheduler or firm if they are unable to produce an approved or organized schedule, even if they meet the above qualifications.
 1. At any time, the Owner may request the presence of the scheduler at any meetings to review the schedule's logic.

1.5 SCHEDULE FORMAT AND GENERAL REQUIREMENTS

- A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.
- B. Diagram Sheet Size: Maximum 30 by 42 inches or width required.
- C. Scale and Spacing: To allow for notations and revisions.

- D. Schedule submittals shall include required reports and data file transmitted via email and/or FTP site. The file shall contain the entire schedule including assigned resources. Each file submittal should have a unique file name indicating baseline, weekly or monthly, Contractor's name and the Data Date. Each report should have the Data Date, Contractor's name and report name.
- E. The schedule may be used as the basis for determining Contract earnings during each update period and therefore the amount of each progress payment.
 - 1. Lack of an approved schedule, qualified scheduling personnel, or failure of Contractor to provide required information will result in disapproval of schedule and may be grounds for withholding progress payments and/or for a determination by the Owner that Contractor is not prosecuting Work with sufficient diligence to ensure completion within the time specified in the Contract.
 - 2. Upon making this determination, the Owner may terminate the Contractor's right to proceed with the Work, or any separate part of it, in accordance with the default terms of the Contract. If, in the opinion of the Owner, the Contractor falls behind the approved schedule, the Contractor shall take steps necessary to improve its progress including those that may be required by the Owner, without additional cost to the Owner. In this circumstance, the Owner may require the Contractor to increase the number of shifts, overtime operation, days of work and/or the amount of construction, and to submit for approval any supplementary schedule or schedules as the Owner deems necessary to demonstrate how the approved rate of progress will be regained.

PART 2 - PRODUCTS

2.1 PRELIMINARY BASELINE SCHEDULE

- A. Prepare preliminary baseline schedule in the form of a preliminary network diagram.
 - 1. Utilize Microsoft Project.
- B. Content:
 - 1. Illustrate entire scope of Work at a high level with at least one activity per subcontractor or responsibility per general area.
 - 2. Owners' tasks that Contractor will be relying on for timely completion of the project.
 - 3. Submittals required to allow construction to begin. Allow 2 working days for review of submittals by the Owner. Include both a Contractor's submittal and an Owner's review as two separate activities.
 - 4. Major or long lead procurement items being procured by either the Owner or the Contractor. Consult with Owner on procurement items or durations prior to the Preliminary Baseline Schedule submittal.
 - 5. Required activity coding.
 - 6. Punch List Activities: Include separate punch list steps for building interior versus building exterior tasks. Include separate activities for Contractor punch list, Contractor corrections, Owner/Architect punch list, and Contractor corrections. Allow a minimum of 5 working days for the initial Owner/Architect punch list.
 - 7. Commissioning Activities: Include a minimum of 3 working days for total commissioning.
 - 8. Include Owner Controlled Float Activities as specified.
 - 9. Utilize correct logic and relationship ties.

10. Utilize Contractor's best estimate on activity durations.
11. Milestones from the contractual milestone list and interim phasing and goal type milestones.
12. Only contractual constraints are allowed. Schedule constraints shall be pre-approved by the Owner.
13. Only two open ends: The first activity - Notice to Proceed - has no predecessor and the last activity - Project Complete - has no successor. All other activities have both a predecessor and successor.
14. Coordinate with existing Owner Schedule for integration as requested by Owner.
15. Incorporate Owner comments.
16. Provide separate schedule of submittal dates for shop drawings, product data and samples, Owner-furnished products, products identified under Allowances and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.
17. Include a line item for Project Closeout.
18. Allow adequate duration to for full startup and commissioning.
19. Indicate delivery dates for Owner-furnished products and products identified under Allowances.
20. Include not more than 30 calendar days for punch list and final completion, unless otherwise indicated.
21. Provide legend for symbols and abbreviations used.
22. Closeout and Commissioning: In the Contractor's Construction Schedule, provide key activities required in Sections 017 700 "Closeout Procedures", and 01 7800 "Closeout Submittals" . These activities will be cost-loaded to a cumulative total of not less than 2 percent of the Contract value.

2.2 FINAL BASELINE SCHEDULE

- A. The approved Final Baseline CPM Schedule is to be used as the master schedule. It will be used to measure the progress of the Work and aid in evaluating time extensions. After approval, the Final Baseline will be archived and a copy will be used to begin the weekly update process. The Final Baseline CPM Schedule is to include:
 1. All requirements of the Preliminary Baseline Schedule.
 2. Required submittals and review periods.
 3. Illustrate the complete scope of work with general area, sub-area, and subcontractor level tasks (not day by day or overly specific sequences unless required due to craft interaction, hold points, or other inspections).
 4. Activities should have only one subcontractor per activity. All subcontractors should have at least one activity. If there are planned gaps in work, use multiple activities to represent their work.
 5. Construction activities should be 20 working days or less in duration unless approved by the Owner.

2.3 WEEKLY PROGRESS SCHEDULES

- A. The Weekly Progress Schedule is to be updated weekly and will be considered the contemporaneous master schedule. It may be used as an aid in evaluating time extensions. The Data Date will be set by the Contractor at the normal start time of the primary construction calendar (08:00 if work starts at 8:00). Data Date is to be advanced weekly throughout the duration of the project. Activities behind (to the left of) the Data Date will have been completed. Activities in front (to the right) of the Data Date have not started. Activities crossing the Data Date are in progress. The Weekly Progress Schedule should:
1. Accurately update the actual start and finish date of all activities that occurred during the previous week.
 - a. The Start Date is the date upon which the Work is commenced in earnest, not preliminary or preparatory work, unless identified as such in the schedule.
 - b. Finish Date will be the date at which the Work is Substantially Complete enough for follow-on work to begin. It does not signify that any or all punch list items are complete or that the Work can be billed for 100 percent. Earned value will be evaluated separately from substantial progress.
 2. Accurately update the Remaining Duration for Work that is statused as In Progress at the time of the update. Remaining Duration shall be updated independently of activity Percent Complete.
 3. Accurately update the achieved Percent Complete of each task activity as of the end of the preceding week. Use of Earned Value tracking methods is recommended but not required.
 4. Document all delays that occurred during the week. Add an activity for that delay with actual start and finish dates and discuss these activities at the weekly schedule meeting.
 5. Activities two weeks or less in front of Data Date can be changed to show slight estimated duration changes, sequence/logic changes or changes in calendars (work on weekends) so as to better illustrate how the work will be executed.
 6. If multiple calendars are used, include a column on all reports showing the calendars.
 7. Changes beyond two weeks out can only be adjusted for the Monthly Progress Schedule and must be documented in the Monthly Narrative.
 8. Submit PDF reports listed in the report section and data on a weekly basis by close of business on each Monday.
 9. Incorporate Owner comments.
 10. Dates from previous weeks cannot be changed once the weekly progress schedule has been submitted except with permission from the Owner.
 11. All schedule mechanics must be followed on each update.
- B. Weekly Schedule Update Review: The Contactor's Project Manager, Authorized Scheduler, Key Subcontractors and Owner shall attend to review the following:
1. Status of Just Complete Tasks: From the weekly schedule update, review last week's tasks, including Actual Start dates (AS), Actual Finish Dates (AF), Remaining Durations (RD) and Percent Complete.
 2. At a minimum, address the following items on an activity by activity basis during each progress meeting.
 - a. Discuss all delays that occurred during the week and recovery plans.

- b. Upcoming Activities: Review logic, duration, crew size, material or equipment needs.
 - c. Critical Activities: Understand and review the activities that must finish on time to avoid a delay to the project completion date. Discuss opportunities to complete these tasks early.
- C. Schedule Constraints: Minimize the use of activity schedule constraints as much as possible. Mandatory and Start On or Finish On type constraints are not allowed.
 - 1. Project Complete: Include as the last activity in Project Schedule an activity called "Project Complete". "Project Complete" should be a finish milestone activity type and have a constraint of finish on or before. Use the end of the day of the Contract completion date for the constraint date and time. The schedule calculations shall result in a negative float when the calculated late finish date of the last activity is later than the contract completion date. The schedule shall have no constrained dates other than those specified in the Contract unless approved by the Owner.
 - 2. Just-in-Time Deliveries: The use of "As Late as Possible" constraint may be allowed for Owner's Procurement items with prior approval of the Owner. If the "As Late As Possible" constraint is used for the Owner's procurement, use a finish milestone activity type and an Activity ID that begins with a P for procurement so those activities are quickly recognized in the constraint list. For example, Activity ID would be P-1000 or P-1010, etc. Once an anticipated delivery date is known, it would be changed to a Finish On or After Constraint. Once the item has arrived on site, remove the constraint and replace with an actual date. Contractor procured items should have a submittal review and procure/deliver activities and not be constrained.
 - 3. Contractor may utilize "As Late as Possible" constraints for activities like Crane or Equipment Mobilization, Scaffold Erection, or other supporting type works that are needed to occur just prior to the start of the construction activity.
 - 4. Interim Completion Dates: Constrain contractually specified interim completion dates with a Finish On or Before constraint to show negative float when the calculated early finish date of the last activity in that phase is later than the specified interim completion date. Use an activity type of finish milestone and put the activity in the Milestone Grouping.
 - 5. Open Ended Logic: There shall only be two open ended activities. The activity Start Project/Notice to Proceed will have no predecessor logic and the activity Project Complete will have no successor logic.
- D. Required Activities and Level of Detail Required: Develop the Project Schedule to an appropriate level of detail. Reasonable activity durations are those that allow the progress of ongoing activities to be accurately determined between update periods. The Owner will consider, but is not limited to, the following characteristics and requirements to determine appropriate level of detail:
 - 1. Include tasks for the following:
 - a. "Prepare, Submit" and "Review, Approve" for submittals that affect the project schedule.
 - b. Include closeout activity.
 - c. 3rd party Inspections, if requested by the Owner.
 - d. Permits. Allow a minimum of 40 calendar days for the "Review, Issue" of each permit. Coordinate with the Owner the anticipated duration.
 - e. Procurement, Construction, Commissioning Activities: Coordinate punch list and commissioning sequence with Owner.

- f. "Prepare, Submit", "Review, Approve" and "Procure, Fab and Deliver" of long lead or major materials, equipment, etc.
 - g. Owner's Activities, include, but are not limited to, reviews, approvals, inspections, Owner Furnished Equipment (OFE), and Notice to Proceed (NTP), etc.
- 2. Milestones: The schedule must include start and finish milestones, all contractual milestones and any interim milestones specified by the Owner.
- 3. Early Project Completion: In the event the Baseline or Progress Update Schedule calculates an early completion date of the last activity to the Contract Completion date and the schedule calculates positive float, the Contractor shall include an activity named "Contractor Contingency" with no cost and a duration equal to the number of calendar days from the date all the contract work is planned to be completed to the official contract completion date as awarded. This activity should only be adjusted on the monthly update.

2.4 SCHEDULE-DRIVEN REQUIREMENTS

- A. A schedule for the purchase, delivery, and receipt of critical items required for performance of the Work, showing lead times between purchase order placement and delivery dates, shall be integrated with the Construction Progress Schedule. Neither the Architect nor the Owner shall be deemed to have approved or accepted such material, or its schedule, nor deemed to have waived this requirement if some or all of the material is not received.
- B. Should the Contractor fail to meet a scheduled date as shown on the current Construction Progress Schedule, the Contractor shall, if requested, be required at its own expense to submit within ten days of the request an updated Construction Progress Schedule.
 - 1. If the Contractor's progress indicates to the Owner that Work will not be Substantially Complete within the Contract Time, the Contractor shall, at its own expense, increase its work force and/or working hours to bring the actual completion dates of the activities into conformance with the Construction Progress Schedule and Substantial Completion within the Contract Time.
 - 2. The Contractor shall reschedule and also submit a revised Construction Progress Schedule at its own expense within ten days of notice from the Architect that the sequence of work varies significantly from that shown on the current Schedule showing work to complete on original Contract Time with approved extensions. Neither the Owner nor the Architect will, however, be obligated to review the substance or sequence of the Construction Progress Schedule or otherwise determine whether it is correct, appropriate or attainable.
- C. Schedule Float Utilization:
 - 1. Float time to activities not on the critical path shall belong to the Project, and may be used by the Project to optimize its construction process. Float time between the end of the final construction activity and the final completion date shall belong to the Owner, and may be used by the Owner in determining if additional Contract days are to be awarded for changes in the Contract or for delays to the Contractor caused by the Owner. The Contractor will not be entitled to adjustment in Contract Time, Construction Schedule, or Contract Sum, or to additional payment of any sort by reason of the Owner's use of float time between the end of final construction activity and final completion date or, by reason of the loss or use of any float time, including time between the Contractor's anticipated completion date and end of the Contract Time, whether or not the float time is described as such on the Construction Progress Schedule.

2.5 SPECIAL REPORTS

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

PART 3 - EXECUTION

3.1 REVIEW AND EVALUATION OF SCHEDULE

- A. Participate in joint review and evaluation of schedule with Owner and Architect at each submittal.
- B. Evaluate project status to determine work behind schedule and work ahead of schedule.

3.2 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Update diagram to graphically depict current status of Work.
- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit reports required to support recommended changes.

3.3 DISTRIBUTION OF SCHEDULE

- A. Distribute copies of updated schedules to Contractor's project site file, to subcontractors, suppliers, Architect, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

END OF SECTION 01 3200

SECTION 01 3233 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Preconstruction photographs.
- B. Periodic construction photographs.
- C. Final completion construction photographs.

1.2 RELATED REQUIREMENTS

- A. Section 01 3000 "Administrative Requirements": Submittal requirements.

1.3 SUBMITTALS

- A. Digital Photographs: Submit image files through Procore with location notes included in the photo notes section.

1.4 USAGE RIGHTS

- A. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.
- B. Do not display photographs in publications without permission of Owner.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA

- A. Digital Images: Provide images in JPG-type file format, produced by a digital camera with minimum sensor size of 8 megapixels, and at an image resolution of not less than 1600 by 1200 pixels and 400 dpi.

PART 3 - EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS

- A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
 - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.

- B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
 - 1. Date and Time: Include date and time in file name for each image.
 - 2. All images to be taken in or stored in Procore.
- C. Preconstruction Photographs - Using Procore: Before commencement of demolition, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.
 - 1. Take a minimum of 100 photographs as necessary to show existing conditions on or adjacent to property before starting the Work.
- D. Periodic Construction Photographs - Using Procore: Take a minimum of 100 photographs monthly, coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.
- E. Final Completion Construction Photographs - Using Procore: Take a minimum of 100 color photographs after date of Substantial Completion for submission as project record documents.

END OF SECTION 01 3233

SECTION 01 4000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Quality assurance submittals.
- B. Mock-ups.
- C. Control of installation.
- D. Testing and inspection services.
- E. Manufacturers' field services.

1.2 RELATED REQUIREMENTS

- A. Section 01 3000 "Administrative Requirements" for submittal procedures.
- B. Section 01 4216 "Definitions".
- C. Section 01 6000 "Product Requirements" for material and product quality requirements.

1.3 SUBMITTALS

- A. Shop Drawings: For integrated exterior mock-ups, provide plans, sections, and elevations, indicating materials and size of mock-up construction.
 - 1. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.
- B. Testing and Inspection Plan: Submit for Owner's and Architect's knowledge.
 - 1. Provide copies to Owner's testing and inspection agencies and authorities having jurisdiction.
- C. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
 - 1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 - 2. Certificates may be recent or previous test results on material or product but, must be acceptable to Architect.
- D. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

- E. Manufacturer's Field Reports: Submit reports in quantities specified for Product Data.
 - 1. Submit report within 30 days of observation to Architect for information.
- F. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility, in accordance with Section 1709.1 of the Oregon Structural Specialty Code, sent to authorities having jurisdiction and the Owner before starting work on the following systems.
 - 1. Seismic-force resisting system, designated seismic system, or component listed in the designated seismic systems and seismic-force-resisting systems statement of inspections indicated on the Structural Drawings.
 - 2. Main wind-force resisting systems and wind-resisting components listed in the wind-force-resisting systems statement of special inspections indicated on the Structural Drawings.
- G. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.4 DEFINITIONS

- A. Mock-ups: Where indicated, physical assemblies that are constructed on-site. Mock-ups 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. Mock-ups are not Samples. Unless otherwise indicated, approved mock-ups establish the standard by which the Work will be judged.
- B. Preconstruction Testing: Tests and inspections performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
- C. 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.

1.5 CONFLICTING REQUIREMENTS

- A. Metal Thickness: Where thickness of metals is designated in both gage and thickness in inches, the thickness in inches shall govern. Gages are provided for convenience only. Specified submittals for metals shall indicate thicknesses in inches.

1.6 REFERENCES AND STANDARDS

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

- B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

1.7 TESTING AND INSPECTION AGENCIES

- 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.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
 - 1. Develop a plan for testing and inspection, including all off-site testing requirements, for review by Architect, Authorities having jurisdiction, Owner and Owner's testing agencies. Excessive testing and inspection costs associated with Contractor's means and methods shall be the responsibility of the Contractor. Testing and inspection shall be contemplated in the Contractor's work plan and phased with Work to mutually benefit both the Contractor's scope and efficiency of testing.
 - 2. 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.
 - 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. Structural Observation Program: The Structural Engineer of Record (SER) shall perform structural observation based on the requirements of the Oregon Structural Specialty Code. Refer to General Structural Notes on Drawings for tabulation of structural observation items and additional requirements. Provide sufficient notice and access to the Structural Engineer of Record in order for the SER to perform required observations.

1.8 MANUFACTURER'S FIELD SERVICES

- A. Manufacturer's Field Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 CONTROL OF INSTALLATION

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

3.2 MOCK-UPS

- A. Mock-ups: Before installing final portions of the Work requiring mock-ups, build mock-ups for each form of construction and finish required to comply with the following requirements as indicated, using materials indicated for the completed Work:
 - 1. Build mock-ups 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 mock-ups will be constructed.
 - 3. Employ supervisory personnel who will oversee mock-up construction. Employ workers that will be employed during the construction at the Project.
 - 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 5. Obtain Architect's acceptance of mock-ups before starting work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mock-up.
 - 6. Maintain mock-ups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 7. Demolish and remove mock-ups when directed, unless otherwise indicated.

3.3 TESTING AND INSPECTION

- A. See individual specification sections for testing and inspection required.
- B. Testing Agency Duties:
 - 1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 - 2. Perform specified sampling and testing of products in accordance with specified standards.
 - 3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 4. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.
 - 5. Perform additional tests and inspections required by Architect.
 - 6. Submit reports of specified tests/inspections.
 - a. One copy of all testing and inspection reports shall be promptly sent directly to the Contractor, Architect, Owner, Structural Engineer, Building Department, Soils Engineer (Soil Compaction), unless otherwise directed.
 - b. In addition to written reports, immediately notify by telephone Architect, Owner and Contractor of any portions of the work found to be in non-compliance with the Contract Documents.
- C. Limits on Testing/Inspection Agency Authority:
 - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Agency may not approve or accept any portion of the Work.
 - 3. Agency may not assume any duties of Contractor.
 - 4. Agency has no authority to stop the Work.
- D. Contractor Responsibilities:
 - 1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 - 2. Cooperate with laboratory personnel and provide access to the Work and to manufacturers' facilities.
 - 3. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
 - c. To facilitate tests/inspections.
 - d. To facilitate geotechnical monitoring.
 - e. To provide storage and curing of test samples.
 - 4. Notify Architect and laboratory 48 hours prior to expected time for operations requiring testing/inspection services.
 - a. When tests or inspections cannot be performed, through the fault of the Contractor, reimburse the Owner for the additional costs incurred.
 - b. Schedule testing and inspection so that the services of testing and inspection personnel will be as continuous and brief as possible.

- c. Reimburse Owner for travel and lodging expenses incurred for testing and inspection services performed outside radius of 100 miles of the site.
 - 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
 - a. When tests or inspections cannot be performed, through the fault of the Contractor, reimburse the Owner for the additional costs incurred.
 - 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
 - a. Schedule testing and inspection so that the services of testing and inspection personnel will be as continuous and brief as possible.
 - b. Reimburse Owner for travel and lodging expenses incurred for testing and inspection services performed outside radius of 100 miles of the site.
 - E. Contractor shall be responsible for coordinating testing services so as to insure that tests are performed and reports delivered in a manner not to cause delays to the Work. Allow adequate time for inspection, geotechnical monitoring and any needed corrections before proceeding to the next construction stage.
 - F. Furnish records, drawings, certificates, and similar data as may be required by the testing personnel to assure compliance with the Contract Documents.
 - G. Provide to the testing agency the approved design mix to be used for concrete, mortar, grout, and other materials mixes which require testing by the testing laboratory. Furnish copies of product test reports performed by Contractor as required by Contract Documents.
 - H. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect.
 - I. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.
- 3.4 INSPECTION AND TESTING LABORATORY REPORTS

- A. The testing agency will perform and furnish the following:
 - 1. Laboratory Test Reports: Furnish laboratory test reports of materials and construction as required, including:
 - a. Date issued.
 - b. Project title and number.
 - c. Testing laboratory or engineering firm name, address, and telephone number.
 - d. Name and signature of representative.
 - e. Description of method of test.
 - f. Identification of sample and portion of the work tested
 - g. Description of location in the work of the sample.
 - h. Time and date of obtaining sample.
 - i. Time and date of test of sample.

- j. Weather and climatic conditions.
 - k. Evaluation of results tests, including recommendations for action, when requested by Architect or Structural Engineer.
2. Field Inspection Reports: Furnish field inspection reports for each site visit documenting activities, observations, and inspections of work being inspected include:
- a. Date issued.
 - b. Project title and number.
 - c. Testing Laboratory or engineering firm name, address, and telephone number.
 - d. Name and signature of representative.
 - e. Observations on weather and climatic conditions.
 - f. Time and date
 - g. Conditions and/or status of the work being inspected.
 - h. Actions taken.
 - i. Recommendations or evaluation of the work.
3. Reports will be submitted to Owner and Architect in duplicate giving observations and results of tests, indicating compliance or non-compliance with specified standards and with Contract Documents.

3.5 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- C. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
 - 1. Name, address, and telephone number of technical representative making report.
 - 2. Statement on condition of substrates and their acceptability for installation of product.
 - 3. Statement that products at Project site comply with requirements.
 - 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 - 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 - 6. Statement whether conditions, products, and installation will affect warranty.
 - 7. Other required items indicated in individual Specification Sections.

3.6 DEFECT ASSESSMENT

- A. When tests or inspection indicate non-compliance with the Contract Documents, subsequent retesting occasioned by such noncompliance shall be performed by the same personnel as performed the initial tests or inspections, and the additional cost shall be paid by the contractor as stipulated under the Conditions of the Contract.

- B. Contractor shall remove and replace any work found defective or not in compliance with the Contract Documents at no additional cost to Owner and furnish notice for retesting as specified herein above.
- C. Replace Work or portions of the Work not conforming to specified requirements.
- D. If, in the opinion of Architect, it is not practical to remove and replace the Work, Architect will direct an appropriate remedy or adjust payment.

3.7 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
- B. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 4000

SECTION 01 4005 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Requirements and limitations for cutting and patching of the Work.

1.2 RELATED REQUIREMENTS

- A. Section 01 6000 "Product Requirements" for fundamental product requirements, substitutions and product options, delivery, storage, and handling.
- B. Section 01 7000 "Execution" for examination, preparation, and general installation procedures.

1.3 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
- B. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

1.4 SUBMITTALS

- A. See Section 01 3000 "Administrative Requirements" for submittal procedures.
- B. Submit written request in advance of cutting or alteration which affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather-exposed or moisture-resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.
 - 4. Visual qualities of sight-exposed elements.
 - 5. Work of Owner or separate contractor.
- C. Include in Request:
 - 1. Identification of Project.
 - 2. Location and description of affected work.
 - 3. Necessity for cutting or alteration.
 - 4. Description of proposed work, and products to be used.
 - 5. Alternatives to cutting and patching.
 - 6. Effect on work of Owner or separate contractor.
 - 7. Written permission of affected separate contractor.
 - 8. Date and time work will be executed.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 2500 "Product Substitution Procedures".

PART 3 - EXECUTION

3.1 GENERAL

- A. Execute cutting, fitting, patching and finishing including excavation and fill, to complete Work, and to:
 - 1. Fit the several parts together, to integrate with other work.
 - 2. Uncover work to install ill-timed work.
 - 3. Match work that has been cut to adjacent work.
 - 4. Repair areas adjacent to cuts to required condition.
 - 5. Repair new work damaged by subsequent work.
 - 6. Remove and replace defective and non-conforming work.
 - 7. Remove samples of installed work for testing.
 - 8. Provide openings in elements of Work for penetrations of mechanical and electrical work.
 - 9. Provide finished appearance of surfaces and to match adjacent surfaces (unless otherwise noted) affected by the Work.

3.2 INSPECTION

- A. Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- B. After uncovering, inspect conditions affecting performance of work.
- C. Beginning of cutting or patching means acceptance of existing conditions.
- D. Review District's current AHERA Management Plan and the Hazardous Materials Survey to become aware of any asbestos containing materials or lead containing painted surfaces that may be impacted prior to the execution of the Work.
 - 1. If unsafe or otherwise unsatisfactory conditions are encountered, take corrective action before proceeding with the Work.

3.3 PREPARATION

- A. Provide supports to assure structural integrity of surroundings; devices and methods to protect other portions of Project from damage.

- B. 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. Maintain excavations free of water.
- C. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

3.4 PERFORMANCE

- A. Execute work by methods to avoid damage to other work, and which will provide proper surfaces to receive patching and finishing.
- B. Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- C. 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. When possible, remove existing materials back to joints or break points. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 5. Roofing: At locations where existing roofing must be removed to accommodate new construction, remove roofing, including insulation as necessary. Provide a temporary cutoff in strict accordance with roofing manufacturer's recommendations, to provide a 100 percent watertight seal.
 - a. If any water is allowed to enter under the existing roofing, the affected area shall be removed and replaced at Contractor's expense.
- D. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
 - 1. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.
 - 2. Match color, texture, and appearance.
 - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.
 - 4. Replacement of defective work will not create new seams or joint lines.

5. Restore work with new products in accordance with requirements of Contract Documents.
6. Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
7. At penetrations of fire-rated wall, ceiling, or floor construction, completely seal voids with fire-rated material, full thickness of the construction element.

- E. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.5 FIELD QUALITY CONTROL

- A. See Section 01 4000 "Quality Requirements" for additional requirements. Materials subject to testing and inspection in the specifications shall be retested after cutting and patching operations are completed.

END OF SECTION 01 4005

SECTION 01 4216 - DEFINITIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section supplements the definitions contained in the General Conditions.
- B. Other definitions are included in individual specification sections.

1.2 SPECIFICATION EXPLANATION

- A. The specifications are divided into Divisions and Sections for the convenience of writing and using. The titles of these are not intended to imply a particular meaning or to fully describe the work of each Division or Section and, are not an integral part of the text which specifies the requirements. The Architect is not bound to define the limits of any subcontract and, will not enter into disputes between the Contractor and its employees, including subcontractors.
- B. These Specifications are of the abbreviated or "streamlined" type and include incomplete sentences. Words and meanings shall be interpreted as appropriate. Words that are implied, but not stated, shall be interpolated as the sense requires. Singular words will be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.
- C. Omissions of words or phrases shall be supplied by inference in the same manner as they are when a "note" occurs on the Drawings.
- D. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

1.3 DEFINITIONS

- A. The definitions in this Section are not necessarily complete or exclusive but, generally, apply to all portions of the Work. Some contractual definitions appear in the General Conditions. Definitions of words of a special nature which relate to Work covered in one or two Sections of the Specifications are included in such Sections. Terms used throughout the Contract Documents are defined in this Section.
- B. Approve: Where used in conjunction with the Architect's or Engineer's response to submittals, requests, applications, inquiries, reports, and claims by the Contractor, the meaning of the term "approved" will be held to the limitations of the Architect's responsibilities and duties as specified in the General and Supplementary Conditions. In no case will "approval" by the Architect be interpreted as an assurance to the Contractor that the requirements of the Contract Documents have been fulfilled. The term "or approved" used in conjunction with specified materials means "properly submitted and approved substitution request."
- C. Contractor: The term "Contractor" means the prime contractor as defined in the Owner-Contractor Agreement.

- D. Coordinate: The term "coordinate" means satisfactorily combine the work of all trades for a complete and operating installation.
- E. Directed, Requested, etc.: Unless otherwise explained, terms such as "directed", "requested", "authorized", "selected", "approved", "required", "accepted", and "permitted" mean "directed by the Architect", "requested by the Architect", etc. However, no such implied meaning will be interpreted to extend the Architect's responsibility into the Contractor's area of construction supervision.
- F. Furnish: Except as otherwise defined in greater detail, the term "furnish" is used to mean supply and deliver to the project site, ready for unloading, unpacking, assembly, installation and similar operations.
- G. General Requirements: The provisions or requirements of Divisions 01 Sections apply to entire work of Contract and, where so indicated, to the other elements of work which are included in the Project.
- H. Guarantee and Warranty: "Warranty" is generally used in conjunction with products manufactured or fabricated away from the project site, and "guarantee" is generally used in conjunction with units of work which require both products and substantial amounts of labor at the project site. The resulting difference is that warranties are frequently issued by manufacturers and frequently supported (partially) by product guarantees from contractors and/or installers.
- I. Indicated: A cross reference to details, notes or schedules on the Drawings, to other paragraphs or schedules in the Specifications, and to similar means of recording requirements in the Contract Documents. Where terms such as "shown", "noted", "scheduled", and "specified" are used in lieu of "indicated", it is for purpose of helping reader locate cross-reference, and no limitation of location is intended except as specifically noted.
- J. Install: Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- K. Installer: The person or entity engaged by the Contractor or their subcontractors for the performance of a particular unit of work at the Project site, including installation, erection, application and similar required operations. It is a general requirement that Installers be recognized experts in the work they are engaged to perform.
- L. Owner: The term "Owner" as used in the Project Manual refers to the Corvallis Public School District.
- M. Product: The term "product" as used in the Project Manual includes materials, systems, and equipment provided by the Contractor for use in the Work.
- N. Project Manual: The term "Project Manual" is the volume which includes the Bidding Requirements, Conditions of the Contract, and the Specifications, Divisions 01 through 33 inclusive, as applicable, and as listed in the Table of Contents bound therein.
- O. Provide: Except to the extent further defined, the term "provide" means to furnish and install, complete and ready for the intended use.

- P. Selected: The term "selected" means "selected by the Architect and Owner"; the Architect shall be the sole judge of the acceptability of a product or an installation.
- Q. Project Site: Space available to the Contractor for performing the Work under this Contract, either exclusively or in conjunction with other contractors as part of the overall Project. The Site may be unimproved vacant land, an existing building or space within an existing building. The extent of the Site is shown on the Drawings.
- R. Specification Language: Imperative language is used, generally, throughout the Specifications. Requirements expressed imperatively are to be performed by the Contractor. For clarity at certain locations, contrasting subjective language is used to describe responsibilities, which must be performed by the Contractor or, when so noted, will be performed by others.
- S. Subcontractor: The term "subcontractor" is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site, or supply materials and/or equipment for the Work. Requirements indicated and applicable to the Contractor shall apply to the subcontractor and authorized representatives of the subcontractor.
- T. Trades: Using terms such as carpentry is not intended to 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 tradespersons of the corresponding generic name.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 01 4216

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SECTION 01 5000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Temporary utility installation.
- B. Support facilities installation.
- C. Security and protection installation.
- D. Mold and moisture control.
- E. Removal of temporary utilities, facilities and controls.

1.2 RELATED REQUIREMENTS

- A. Section 01 7000 "Execution" for progress cleaning.
- B. Section 01 7419 "Construction Waste Management and Disposal".
- C. Section 31 2500 "Slope Protection and Erosion Control".

1.3 SUBMITTALS

- A. Staging: Submit staging and logistics plan on Project Site Plan to District and governing authorities, including emergency response agencies, for review and approval prior to commencement of Work.
- B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of Section 31 2500 "Temporary Erosion and Sediment Control" or authorities having jurisdiction, whichever is more stringent.
- C. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage, including delivery, handling, and storage provisions for materials subject to water absorption or water damage, discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water damaged Work.
 - 1. Indicate sequencing of work that requires water and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
- D. Dust-Control, Odor, and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust-control, odor, and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:

1. Locations of dust-control partitions at each phase of the work.
2. HVAC system isolation schematic drawing.
3. Location of proposed air filtration system discharge.
4. Other dust-control and odor measures.
5. Waste management plan.

1.4 QUALITY ASSURANCE

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

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES

- A. Utility Usage Charges: Owner will pay for utility usage charges.
 1. Owner will furnish reasonable quantities of water and electricity to the Contractor without charge. Contractor shall be responsible for both temporary utility connections and disconnects, and all associated costs. Obtain permission of the Owner and authorities having jurisdiction prior to accomplishing either.
- B. Common-Use Field Office: Of sufficient size to accommodate collaborative needs of Owner, Architect and Contractor for project meetings specified in Section 01 3000 "Administrative Requirements" and various group meetings. Keep office clean and orderly. Equip offices as follows:
 1. Pay for temporary mobile unit permits as required by the local governing agencies.
 2. Conference room of sufficient size to accommodate meetings of ten individuals.

PART 3 - EXECUTION

3.1 TEMPORARY UTILITY INSTALLATION

- A. Temporary Utility Installation, General:
 1. Engage local utility companies to install temporary service or to make connections to existing service.
 2. Arrange with the companies and existing users for an acceptable time when service can be interrupted to make connections.

3. Establish a service implementation and termination schedule. As early as possible, change to use of permanent service, to enable removal of the temporary utility and to eliminate any possible interference with completion of the Work.
 4. Provide adequate capacity for each stage of construction.
- B. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. Exercise measures to conserve water.
1. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.
 2. Use trigger-operated nozzles for water hoses, to avoid waste of water
- C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
1. Supply toilet tissue, hand sanitizer, and similar disposable materials as appropriate for each facility. Provide covered waste containers for used material.
 2. Provide adequate number of facilities for use by all persons and trades employed on Work during construction period.
 3. Maintain daily in clean and sanitary condition.
 4. Toilets: Use of Owner's existing toilet facilities will not be permitted.
- D. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.
- E. Electric Power Service: With Owner's prior approval, connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
1. Provide power outlets for construction operations, with branch wiring and distribution boxes located as needed. Provide flexible power cords as required.
 2. Power connection and consumption shall not disrupt Owner's need for continuous service.
- F. Telecommunication and Digital Document Service: Provide temporary telecommunication service for use by all construction personnel.
1. Internet Connections: Minimum of one DSL modem or faster. Provide adequate coverage.
 2. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

3.2 SUPPORT FACILITIES INSTALLATION

- A. Vehicular Access and Parking: Conduct the Work so as to ensure the least possible obstruction to vehicular traffic and inconvenience to the general public and the residents in the vicinity of the Work and to ensure the protection of persons, property and natural resources. No road or street

shall be closed to the public except with the permission of the Owner and the proper governmental authority. Make temporary provisions to ensure the use of sidewalks, fire lanes, private and public driveways and proper functioning of gutters, sewer, inlets, drainage ditches and culverts, irrigation ditches and natural water courses, if any on the Work site.

1. Parking area for project visitors and construction personnel shall be at location designated by Owner.
 2. Construct and maintain temporary access to public thoroughfares to serve construction area, as necessary.
 - a. Relocate as Work progress requires. Provide detours necessary for unimpeded traffic flow.
 3. Coordinate access and haul routes with governing authorities and Owner.
 4. Provide and maintain access to fire hydrants, free of obstructions.
 5. Provide means of removing mud from vehicle wheels before entering streets.
 6. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.
 7. Provide barricades, warning signs, flag men or other traffic regulators which may become necessary for protection of public, construction personnel and property.
 8. Protect existing pavement and driveways from damage from construction equipment.
- B. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Section 01 7000 "Execution" for progress cleaning requirements.
1. Comply with requirements of Section 01 7419 "Construction Waste Management and Disposal".
 2. Provide construction dumpsters. Do not intermingle trash with school dumpsters.
 3. Provide waste recycling bins and containers for metal, glass, cardboard, gypsum, etc. Provide for pick-up on a regular basis so as not to encumber the site. Place bins away from any building structures to protect against fires.
 4. Complete record keeping as required by the District sustainability plan.

3.3 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
1. Burning or burying of rubbish and waste materials on Project Site prohibited. Provide dump box for collection of waste materials.
 2. Disposal of volatile fluid wastes (such as mineral spirits, oil or paint thinner) in storm or sanitary sewer systems is strictly prohibited.
- B. Dust Control:
1. Periodically wet down site as required to keep flying dust to minimum. Comply with regulations of state and local jurisdiction.
- C. Progress Cleaning: Comply with requirements specified in Section 01 7000 "Execution".

- D. Barriers: Provide barriers to prevent unauthorized entry to construction areas, to allow for Owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
 - 1. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
 - 2. Provide protection for plants designated to remain. Replace damaged plants.
 - 3. Provide barricades required by governing authorities for work in public right of way.
- E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
 - 1. Provide barricades or fencing and maintain same around all trees, shrubs or other landscaped areas adjacent to work of this Contract to protect such areas from damage of any nature caused by construction operations.
 - 2. Replace any plantings damaged or destroyed with plants of equivalent size, type and nature as approved by Architect.
 - 3. Comply with requirements specified in Section 01 5639 "Temporary Tree and Plant Protection".
- F. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
 - 1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations, unless otherwise indicated on Drawings. Coordinate extent with Owner and Architect prior to installing fencing.
 - 2. Construction: Commercial grade chain link fence, unless otherwise indicated.
 - 3. Provide 6-foot high fence. Equip with vehicular and pedestrian gates with locks.
 - a. Provide support blocks and bracing as required to completely stabilize fencing and gates.
 - b. Maintain fencing for duration of construction. Move fencing as required for orderly progression of work; maintain secure enclosure at all times.
 - c. Remove fencing and supports prior to Substantial Completion, when such removal will not create a safety hazard for the public.
- G. Security: Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.
 - 1. Identification Badges: The Contractor and its subcontractors, and the employees and the agents of any of them shall comply with District's policies and requirements to obtain, display, and return identification badges at any time while they are present on District's property. All contract personnel shall wear an ID badge that is a distinctive color with the word "Contractor" on the badge. The badge must be worn by any contract personnel within existing buildings. Contractor's Superintendent shall issue badges and maintain process.
 - a. Provide identification badge to each person authorized to enter premises.
 - b. Badge to include personal photograph, name, assigned number, expiration date and employer.

- c. Maintain a list of accredited persons. Submit copy to Owner on request.
 - d. Require return of badges at expiration of their employment on the Work.
- 2. Where materials and equipment must be temporarily stored and are of substantial value, or attractive for possible theft, provide secure lockup.
- 3. Enforce strict discipline in connection with the timing of installation and release of materials to minimize the opportunity for theft and vandalism.
- 4. Additional Provisions of Owner's Security Program - Contact with Students:
 - a. "Unsupervised contact" with students means contact that provides the person opportunity and probability for personal communication or touch with students when not under direct District supervision.
 - b. As required by ORS 326.603, Contractor shall ensure that Contractor, any subcontractors, and their officers, employees, and agents will have no direct, unsupervised contact with students while on District property.
 - c. Contractor shall work with District to ensure compliance with this requirement. If (1) the work site is not a "closed site" as described below, and (2) Contractor is unable to ensure through a security plan that none of its officers, employees, or agents or those of its subcontractors will have direct, unsupervised contact with students in a particular circumstance or circumstances, then Contractor shall notify District before beginning any Work that could result in such contact.
 - d. Contractor authorizes District to obtain information about Contractor and its history and to conduct a criminal background check, including fingerprinting, of any Contractor officers, employees, or agent who may have unsupervised contact with students. Contractor shall cause its employees and/or subcontractors, if any, to authorize District to conduct these background checks.
 - e. All Contractors and their employees, whether full time or part time, working at closed sites must undergo a criminal history verification for disqualifying convictions per ORS 342.143. Criminal history verification checks will be conducted at the Owner's expense, by the District approved third party vendor.
- 5. Closed Sites. At District sites that are closed for construction or other purposes, Contractor fingerprinting is not required. However, all contractors and their employees whether full time or part time working at closed sites must undergo a criminal history verification for disqualifying convictions per ORS 342.143. Criminal history verification checks will be conducted at the Owner's expense, by the District approved third party vendor. Prior to entry of a Contractor's employees onto a jobsite, the Contractor shall verify that employees have successfully passed the criminal history verification check.
- H. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- I. Temporary Exterior Enclosures: Provide temporary insulated weathertight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

- J. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
 - 1. Prohibit tobacco use and vaping on school property.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
 - 4. Take all precautions to prevent possibility of fire resulting from construction operations. Particularly avoid hazardous accumulations of rubbish and unsecured, flammable materials.
 - 5. Provide emergency fire extinguishing equipment of adequate type and quantity, readily available and properly maintained.
- K. Temporary First Aid Facilities: Provide adequate first aid facilities for construction personnel.

3.4 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping moisture in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction:
 - 1. Protect porous materials from water damage.
 - 2. Protect stored and installed material from flowing or standing water.
 - 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 - 4. Remove standing water from decks.
 - 5. Keep deck openings covered or dammed.

3.5 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.
- B. Clean and repair damage caused by installation or use of temporary work.
- C. Restore new permanent facilities used during construction to specified condition.

END OF SECTION 01 5000

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SECTION 01 5639 - TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Protection of existing trees from damage.

1.2 REFERENCE STANDARDS

- A. ANSI A300 - Tree Care Operations Standards.

1.3 DEFINITIONS

- A. Designated Trees: Existing Trees to Remain as indicated on Drawings.
- B. Critical Root Zone (CRZ):
 - 1. CRZ for trees 4 inches in caliper or smaller shall be an area with a radius of at least 5 feet from the trunk.
 - 2. CRZ for trees over 4 inches in caliper shall be the greater area of the following options:
 - a. An area 5 feet beyond the existing tree canopy.
- C. Zone of Protection: The CRZ and as indicated on Drawings.

1.4 POSTING

- A. When directed, post Designated Trees with Notice sign provided by Owner's Representative. Attach sign to tree with twine or staples, no nails. Maintain and protect the Notice sign until completion of construction. Obtain approval of Owner's Representative prior to removal of sign.

1.5 NOTICE

- A. Notify all workers, including subcontractors, of the requirements to protect Designated Trees using Notice provided.

1.6 PROTECTIVE FENCING

- A. Install protective fencing around Designated Trees, where shown on Drawings, prior to commencement of any work. Fencing to be a minimum 6 foot chain link, with fence posts securely anchored. Maintain during construction. Adjustments to fence locations are to be approved by the Owner's Representative prior to performing any work within the Zone of Protection.
- B. No construction activities are permitted within the protective fencing without prior approval of the Owner's Representative.

1.7 TRENCHING AND EXCAVATION

- A. All trenching and excavation within the Zone of Protection is to be performed with the use of an air spade or by hand. Obtain Owner's Representative approval of trenching and excavation locations and methods prior to performing any work.

1.8 ROOT PRUNING

- A. Prune roots encountered during construction with an approved root-pruning device. Make clean, vertical cuts. Do not leave split or frayed ends. Obtain Owner's Representative approval prior to cutting roots larger than 1-1/2 inches in diameter. Backfill exposed roots with specified Planting Soil as soon as practical.

1.9 TREE CANOPY PRUNING

- A. Prune canopies of Designated Trees impacted by construction only upon approval of Owner's Representative. All canopy pruning must be performed by a certified arborist.

1.10 MULCH

- A. Provide four (4) inch deep bark mulch within zone of protection as directed, see Section 32 9000 – "Planting".

1.11 WATERING

- A. Water trees if required by Owner's Representative. Watering will be required if it is judged that root removal is necessary for construction and threatens the survival of the tree. Use a slow drip or soaker hose to provide one-inch water per week until completion of construction.

1.12 PROHIBITED ACTIVITIES

- A. Cutting of roots larger than 1-1/2-inch diameter or larger without approval of Owner's Representative.
- B. Damaging tree bark or branches.
- C. Removal of protective fencing or notice posted on trees prior to approval of Owner's Representative.
- D. Activities prohibited within the Zone of Protection (without prior approval) are, but not limited to: construction, operation of machinery, storage of materials, paving, grading, cutting, filling, travel within, dumping, disposal of liquids, and parking of vehicles or equipment.

1.13 DAMAGE

- A. Actual tree damage such as trunk scoring and broken limbs or damaged roots inside the Zone of Protection will be assessed according to the percentage of loss of tree value. Percentage of tree value will be determined by the Owner's Representative. Tree value will be determined from "Evaluation of Landscape Trees, Shrubs, and Other Landscape Plants" by International Society of Arboriculture.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 01 5639

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SECTION 01 5721 - INDOOR AIR QUALITY CONTROLS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Construction procedures to promote adequate indoor air quality after construction.
- B. Building flush-out after construction and before occupancy.
- C. Testing indoor air quality after completion of construction.

1.2 PROJECT GOALS

- A. Dust and Airborne Particulates: Prevent deposition of dust and other particulates in HVAC ducts and equipment.
 - 1. Cleaning of ductwork is not contemplated under this Contract.
 - 2. Contractor shall bear the cost of cleaning required due to failure to protect ducts and equipment from construction dust.
 - 3. Establish condition of existing ducts and equipment prior to start of alterations.
- B. Airborne Contaminants: Procedures and products have been specified to minimize indoor air pollutants.
 - 1. Avoid construction practices that could result in contamination of installed products leading to indoor air pollution.
- C. Ventilation: HVAC system has been designed to achieve the minimum requirements for ventilation specified in ASHRAE 62.1.

1.3 RELATED REQUIREMENTS

- A. Section 01 4000 "Quality Requirements" for testing and inspection services.
- B. Section 01 6119 "Volatile Organic Compound (VOC) Content Restrictions".
- C. Section 23 0593 "Testing, Adjusting, and Balancing for HVAC" for testing HVAC systems for proper air flow rates, adjustment of dampers and registers, and settings for equipment.
- D. Section 23 0130.51 "HVAC Air Duct Cleaning: Cleaning air ducts, equipment, and terminal units.

1.4 REFERENCE STANDARDS

- A. ASHRAE Std 52.2, Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.
- B. ASHRAE Std 62.1, Ventilation For Acceptable Indoor Air Quality.

1.5 DEFINITIONS

- A. Adsorptive Materials: Gypsum board, acoustical ceiling tile and panels, carpet and carpet tile, fabrics, fibrous insulation, and other similar products.
- B. Contaminants: Gases, vapors, regulated pollutants, airborne mold and mildew, and the like, as specified.
- C. Particulates: Dust, dirt, and other airborne solid matter.
- D. Wet Work: Concrete, plaster, coatings, and other products that emit water vapor or volatile organic compounds during installation, drying, or curing.

1.6 SUBMITTALS

- A. See Section 01 3000 "Administrative Requirements" for submittal procedures.
- B. Indoor Air Quality Management Plan:
 - 1. Describe in detail measures to be taken to promote adequate indoor air quality upon completion; meet or exceed the recommended control measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines For Occupied Buildings Under Construction, 2nd Edition 2007, ANSI/SMACNA 008-2008 (Chapter 3).
 - a. Submit not less than 60 days before enclosure of building.
 - b. Identify potential sources of odor and dust.
 - c. Identify construction activities likely to produce odor or dust.
 - d. Identify areas of project potentially affected.
 - e. Evaluate potential problems by severity and describe methods of control.
 - f. Describe construction ventilation to be provided, including type and duration of ventilation, use of permanent HVAC systems, types of filters and schedule for replacement of filters.
 - g. Describe cleaning and dust control procedures.
 - h. Describe coordination with commissioning procedures.
 - 2. Protect stored on-site and installed absorptive materials for moisture damage.
 - 3. If permanently installed air handlers are used during construction, filtration media must be used at each return air grille that meets one of the following criteria below. Replace all filtration media immediately prior to occupancy.
 - a. Filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 as determined by ASHRAE Standard 52.2-1999 (with errata but without addenda).
 - b. Filtration media is Class F5 or higher, as defined by CEN Standard EN 779-2002, Particulate air filters for general ventilation, Determination of the filtration performance.
 - c. Filtration media with a minimum dust spot efficiency of 30 percent or higher and greater than 90 percent arrestance on particle size of 3-10 ug.
- C. Photo Log: Maintain a detailed photo log of the construction IAQ management plan practices followed during construction.

- D. Interior Finishes Installation Schedule: Identify each interior finish that either generates odors, moisture, or vapors or is susceptible to adsorption of odors and vapors, and indicate air handling zone, sequence of application, and curing times.
- E. Duct and Terminal Unit Inspection Report.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Low VOC Materials: See Section 01 6119 "Volatile Organic Compound (VOC) Content Restrictions".
- B. Low VOC Materials: See other sections for specific requirements for materials with low VOC content.
- C. Auxiliary Air Filters: MERV of 8, minimum, when tested in accordance with ASHRAE 52.2, with Addenda A through F.

PART 3 - EXECUTION

3.1 CONSTRUCTION PROCEDURES

- A. Meet or exceed the recommended control measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines For Occupied Buildings Under Construction, 2nd Edition 2007, ANSI/SMACNA 008-2008 (Chapter 3).
- B. Prevent the absorption of moisture and humidity by adsorptive materials by:
 - 1. Sequencing the delivery of such materials so that they are not present in the building until wet work is completed and dry.
 - 2. Delivery and storage of such materials in fully sealed moisture-impermeable packaging.
 - 3. Provide sufficient ventilation for drying within reasonable time frame.
- C. Begin construction ventilation when building is substantially enclosed.
- D. If extremely dusty or dirty work must be conducted inside the building, shut down HVAC systems for the duration; remove dust and dirt completely before restarting systems.
- E. When working in a portion of an occupied building, prevent movement of air from construction area to occupied area.
- F. HVAC equipment and supply air ductwork may be used for ventilation during construction with Owner's approval:
 - 1. Operate HVAC system on 100 percent outside air, with 1.5 air changes per hour, minimum.
 - 2. Ensure that air filters are correctly installed prior to starting use; replace filters when they lose efficiency.

3. Where return air ducts must be used for ventilation, install auxiliary filters at return inlets, sealed to ducts; use filters with at least the equivalent efficiency as those required at supply air side; inspect and replace filters when they lose efficiency.
- G. Do not store construction materials or waste in mechanical or electrical rooms.
- H. Prior to use of return air ductwork without intake filters clean up and remove dust and debris generated by construction activities.
1. Inspect duct intakes, return air grilles, and terminal units for dust.
 2. Clean plenum spaces, including top sides of lay-in ceilings, outsides of ducts, tops of pipes and conduit.
 3. Clean tops of doors and frames.
 4. Clean mechanical and electrical rooms, including tops of pipes, ducts, and conduit, equipment, and supports.
 5. Clean return plenums of air handling units.
 6. Remove intake filters last, after cleaning is complete.
- I. Do not perform dusty or dirty work after starting use of return air ducts without intake filters.
- J. Replace all filtration media just before occupancy, installing only a single set of final filtration media.
- K. Prohibit tobacco use and vaping on school property.
- L. Exhaust fumes from idling vehicles and gasoline-fueled tools to the exterior of the building through the use of funnels or temporary piping.
- M. Ventilate using 100 percent outside air (depending on the weather conditions) to exhaust contaminated air directly to the outside during installation of VOC-emitting materials. Depressurizing the work area will allow the air pressure differential between construction and clean areas to contain dust and odors. Provide temporary barriers that contain the construction area.
- N. Institute cleaning activities designed to control contaminants in building spaces during construction and before occupancy. Use vacuum cleaners with high-efficiency particulate filters, increase cleaning frequency and use wetting agents for dust.
- O. Use other relevant recommendations of SMACNA IAQ Guideline for Occupied Buildings Under Construction for avoiding unnecessary contamination due to construction procedures.

END OF SECTION 01 5721

SECTION 01 6000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Manufacturer's standard warranties and special warranties.
- B. General product requirements.
- C. Re-use of existing products.
- D. Transportation, handling, storage and protection.
- E. Product option requirements.
- F. Maintenance materials, including extra materials, spare parts, tools, and software.

1.2 RELATED REQUIREMENTS

- A. Section 01 1000 "Summary" for delegated design requirements.
- B. Section 01 2500 "Product Substitution Procedures" for substitution limitations and procedures.
- C. Section 01 4000 "Quality Requirements" for product quality monitoring.
- D. Section 01 6119 "Volatile Organic Compound (VOC) Content Restrictions" for requirements for VOC-restricted product categories.
- E. Section 017419 "Construction Waste Management and Disposal" for recycling and waste disposal requirements potentially affecting packaging and substitutions.

1.3 SUBMITTALS

- A. Proposed Products List: Electronically submit list of major products and list of finish materials proposed for use, with name of manufacturer, trade name, and model number of each product.
 - 1. Submit within 15 days after date of Agreement.
 - 2. For products specified only by reference standards, list applicable reference standards.
 - 3. Indicate product lead times.
- B. Substitution Requests: Submit in accordance with Section 01 2500 "Product Substitution Procedures".
- C. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

- D. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- E. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

1.4 QUALITY ASSURANCE

- A. For products or workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- 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.
- D. Should specified reference standards conflict with Contract Documents, request clarification from the Architect before proceeding.
- E. Neither the contractual relationships, duties, nor responsibilities of the parties in Contract nor those of the Architect shall be altered by the Contract Documents by mention or inference otherwise in any reference document.
- F. Contractor warrants to the Owner that the materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of material and equipment.

1.5 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. 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 Section 01 7700 "Closeout Procedures".

PART 2 - PRODUCTS

2.1 EXISTING PRODUCTS

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the Contract Documents.
- B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.
- C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.
- D. Reused Products: Reused products include materials and equipment previously used in this or other construction, salvaged and refurbished as specified.
- E. Specific Products to be Reused: The reuse of certain materials and equipment already existing on the project site is required.
 1. See Drawings and Section 02 4119 "Selective Demolition" for list of items required to be salvaged for reuse and relocation.

2.2 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by the Contract Documents.
 1. Means new material, machinery, components, equipment, fixtures, and systems comprising the Work. Does not include machinery and equipment used for preparation, fabrication, conveying, and erection of the Work.
 2. Products may also include existing materials or components when specifically designated for reuse.
- B. DO NOT USE products having any of the following characteristics:
 1. Made using or containing CFC's or HCFC's.
 2. Made of wood from newly cut old growth timber.

- C. Where other criteria are met, Contractor shall give preference to products that:
1. Are extracted, harvested, and/or manufactured closer to the location of the project.
 2. Have longer documented life span under normal use.
 3. Result in less construction waste.
 4. Are made of vegetable materials that are rapidly renewable.

2.3 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. Two or more items of the same kind shall be considered identical and by the same manufacturer.
 4. Provide products suitable for service conditions.
 5. Adhere to equipment capacities, sizes and dimensions shown or specified unless variations are specifically approved in writing.
 6. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 7. Where products are accompanied by the term "as selected," Architect will make selection.
 8. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

2.4 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming Products of More than One Manufacturer: Use one of the products named and meeting specifications, no options or substitutions allowed.
- D. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.
- E. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Submit a request for substitution for other named manufacturers. Use of manufacturers not named not allowed.

- F. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
 - 1. If no product available within specified category matches and complies with other specified requirements, comply with requirements for substitutions
- G. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.5 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 - EXECUTION

3.1 TRANSPORTATION AND HANDLING

- A. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- B. 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.
- C. Transport and handle products in accordance with manufacturer's instructions.
- D. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- E. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- F. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.
- G. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.2 STORAGE AND PROTECTION

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store materials in a manner that will not endanger Project structure.

- C. Store and protect products in accordance with manufacturers' instructions.
- D. Store with seals and labels intact and legible.
- E. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- F. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
- G. For exterior storage of fabricated products, place on sloped supports above ground.
- H. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.
- I. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- J. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- K. Prevent contact with material that may cause corrosion, discoloration, or staining.
- L. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- M. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION 01 6000

SECTION 01 6116 - DELEGATED DESIGN REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. General: This Section specifies administrative and procedural requirements for delegated design indicated in the various Sections of these Specifications.
- B. Section Includes: Structural and other design requirements for delegated design components, otherwise known as fabricator-designed, bidder-designed or bidder design-build components.
- C. This Section applies to Technical Specification Sections, and supplements requirements indicated in the General and Supplementary Conditions.
- D. Delegated design does not mean deferred submittal. See Drawings for deferred submittals.
- E. Related Requirements: Refer to sections indicated for specific delegated design requirements, including, but not limited to the following:
 - 1. Section 05 5000 "Metal Fabrications."
 - 2. Section 09 5113 "Acoustical Panel Ceilings."

1.2 DEFINITIONS

- A. Contractor Design Requirements: Where occurs, same meaning as Delegated Design Requirements.
- B. Delegated Design Work: Design services and certifications provided by a Professional Engineer registered as such in the State where the Project is located related to systems, materials or equipment required for the Work to satisfy design and performance criteria established by the Contract Documents. Delegated Design does not include professional services the Contractor needs to fulfill their responsibilities under the Contract including but not limited to construction means, methods and sequence.
- C. Seal: Certification that builder design plans, computations and specifications were designed and prepared under the direct supervision of the Architect or Engineer whose name appears thereon.
- D. Approval Stamp: Certification obtained by the Contractor that the Building Official has reviewed a submittal, and finds it acceptable with respect to applicable regulatory requirements.
- E. Bidder-Design: Design services provided by an installer or manufacturer complying with quality assurance, performance requirements and design requirements indicated and established by the Contract Documents. Bidder-design does not include Professional Engineering unless indicated otherwise.

1.3 DELEGATED- AND BIDDER-DESIGN SERVICES

- A. Where referenced in these specifications, Delegated Design components and their attachments to the structure shall comply with the currently adopted edition of all applicable state and local ordinances, with parameters as specified in the individual sections.
- B. Where referenced in these specifications, Bidder-Design components and installation shall comply with the currently adopted edition of all applicable state and local ordinances, with parameters specified in this and individual sections.
- C. Permitting Agency Requirements: Follow the requirements for permits current at the time of submission. The General Contractor is responsible to coordinate and submit all material required, so the permitting agency's review will not adversely affect the construction schedule. At or near time of application, the General Contractor shall meet with the permitting agency to identify Delegated Design components and how they are to be submitted and processed for permits.
- D. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

1.4 SUBMITTALS

- A. General: Submit complete Delegated Design Submittals to meet permitting agency requirements for permits. Include drawings and calculations for that portion of the Work signed and sealed by a State of Oregon registered engineer. Incomplete submittals or submittals not previously reviewed and so stamped by General Contractor will not be accepted for review by the Architect or Engineer of Record.
- B. These submittal requirements are in addition to other submittal requirements stated elsewhere in the contract documents.

1.5 QUALITY ASSURANCE

- A. Where referenced in these specifications, Delegated Design components and their attachments to the structure shall comply with the currently adopted edition of all applicable state and local ordinances, with parameters as specified in this section.
- B. Permitting Agency Requirements: Follow the requirements for permits current at the time of submission. The General Contractor is responsible to coordinate and submit all material required, so the permitting agency's review will not adversely affect the construction schedule. At or near time of application, the General Contractor shall meet with the permitting agency to identify Delegated Design components and how they are to be submitted and processed for permits.

1.6 INSURANCES

- A. Refer to General Conditions for Insurance and Bonds.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 WORK INCLUDED

- A. General: Certain of the components of the Work under this project are Delegated Design. It is the General Contractor's responsibility to coordinate and assume or assign to subcontractors the complete responsibility for the design, calculations, submittals, fabrication, transportation and installation of the Delegated Design portions or components as required in this Section.
- B. The General Contractor is responsible to submit all documents required by the permitting agency for the separate approval and permit for each Delegated Design item. Delegated Design components of this Work are defined as complete, operational systems, provided for their intended use.
- C. All permit plan review and permit fees for Delegated Design items are the responsibility of the submitting General Contractor.

3.2 DOCUMENTS REQUIRED

- A. General: Delegated Design documents and related permits issuance must be completed prior to fabrication. The General Contractor must complete and submit a Contractor Design Summary Sheet listing Delegated Design Subcontractors and their registered engineer's names and phone numbers prior to submission of the Delegated Design documents for review.
- B. Scope of Documents: Delegated Design components are shown in the Contract Documents for design intent. The purpose is to have the General Contractor responsible to provide, coordinate and install each Delegated Design component.
 - 1. Delegated Design components attached to the structural frame or supplemental to the structural frame shall be designed for the anticipated loads as outlined in the Contract Documents. These Delegated Design components are all to be coordinated with appropriate subcontractors.
 - 2. Load reactions at the interface between the Delegated Design components and the structural frame shall be clearly defined to allow for a review by the Architect and Engineer of Record.
- C. Component Certification: Certify that mechanical and electrical components comply with the structural provisions of all applicable codes.
 - 1. Shop Drawings: Submit shop drawings for all attachments to the structure for all elements requiring structural design per these specifications. These attachments include, but are not limited to, structural bracing for equipment, conveyances, and architectural components; seismic restraints of vibration isolation systems; and details of lateral bracing and attachment systems designed to accommodate differential movement between building levels.
 - 2. Shop Drawings shall be sealed by the structural engineer responsible for their design.

- D. Quality Assurance Plan: Submit a quality assurance plan for the designated structural system of all elements requiring structural design per these specifications. Quality assurance plan shall comply with Owner's requirements and all applicable codes.

END OF SECTION 01 6116

SECTION 01 6119 - VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. VOC restrictions for product categories listed below under "DEFINITIONS."
- B. All products of each category that are installed in the project must comply; Owner's project goals do not allow for partial compliance.
- C. Section requirements apply to all Project Work.

1.2 RELATED REQUIREMENTS

- A. Section 01 3000 "Administrative Requirements" for submittal procedures.
- B. Section 01 6000 "Product Requirements" for fundamental product requirements, substitutions and product options, delivery, storage, and handling.
- C. Section 01 6119.01 "Accessory Material VOC Content Certification Form".

1.3 DEFINITIONS

- A. VOC-Restricted Products: All products of each of the following categories when installed or applied on-site in the building interior:
 - 1. Adhesives, sealants, and sealer coatings.
 - 2. Tiling.
 - 3. Carpet.
 - 4. Resilient flooring and accessories, including resilient base.
 - 5. Resilient athletic flooring.
 - 6. Fluid applied flooring.
 - 7. Wood athletic flooring.
 - 8. Painting and coatings.
 - 9. High-performance coatings.
 - 10. Composite wood and agrifiber products used either alone or as part of another product.
 - 11. Other products when specifically stated in the specifications.
- B. Interior of Building: Anywhere inside the exterior weather barrier.
- C. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.
- D. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.

1.4 REFERENCE STANDARDS

- A. CAL (VOC) - Standard Practice for the Testing of Volatile Organic Emissions From Various Sources Using Small-Scale Environmental Chambers (including Addendum 2004-01); State of California Department of Health Services.
- B. CRI (GLP) - Green Label Plus Carpet Testing Program - Approved Products; Carpet and Rug Institute.
- C. FloorScore Standard; current edition.
- D. GreenSeal GC-03, Anti-Corrosive Paints; Green Seal, Inc
- E. GreenSeal Standard GS-11, Paints and Coatings; Green Seal, Inc.; 1st Edition, May 20, 1993; www.greenseal.org.
- F. GreenSeal GS-36, Commercial Adhesives; Green Seal, Inc.
- G. SCAQMD 1113, South Coast Air Quality Management District Rule No.1113; current edition; www.aqmd.gov.
- H. SCAQMD 1168, South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.

1.5 SUBMITTALS

- A. See Section 01 3000 “Administrative Requirements,” for submittal procedures.
- B. Product Data: For each VOC-restricted product used in the project, submit product data showing evidence of compliance, except when another type of evidence of compliance is required.
- C. Accessory Material VOC Content Certification Form: Require each installer of any type of product (not just the products for which VOC restrictions are specified) to certify that either 1) no adhesives, joint sealants, paints, coatings, or composite wood or agrifiber products have been used in the installation of his products, or 2) that such products used comply with these requirements.
 - 1. Use the form following this Section for installer certifications.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Adhesives and Joint Sealants used on the interior of the building (defined as inside the weatherproofing system):
1. Adhesives, sealants and sealant primers shall comply with South Coast Air Quality Management District (SCAQMD) Rule No.1168 effective date of July 1, 2005 and rule amendment date of January 7, 2005 or, provide products that meet the testing and product requirements of the State of California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions From Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
 2. Aerosol adhesives shall comply with GreenSeal Standard for Commercial Adhesives GS-36 requirement in effect on October 19, 2000 or, provide products that meet the testing and product requirements of the State of California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions From Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
 3. Evidence of Compliance: Acceptable types of evidence are:
 - a. Report of laboratory testing performed in accordance with requirements.
 - b. Published product data showing compliance with requirements.
 - c. Certification by manufacturer that product complies with requirements.
- B. Paints and Coatings used on the interior of the building (defined as inside the weatherproofing system):
1. Provide coatings that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 2. Architectural Paints and Coatings: Do not exceed VOC content limits established in Green Seal Standard GS-11, Paints, 1st Edition, May 20, 1993 OR provide products that meet the testing and product requirements of the State of California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions From Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
 3. Anti-Corrosive and Anti-Rust Paints: Do not exceed VOC content limits established in Green Seal Standard GC-03, Anti-Corrosive Paints, 2nd Edition, January 7, 1997 OR provide products that meet the testing and product requirements of the State of California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions From Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
 4. Clear Wood Finishes, Floor Coatings, Stains, Primers, Sealers and Shellacs applied to interior elements: Do not exceed the VOC content limits established in South Coast Air Quality Management District (SCAQMD) Rule No. 1113, Architectural Coatings, rules in effect on January 1, 2004 OR provide products that meet the testing and product requirements of the State of California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions From Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

5. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
 6. Evidence of Compliance: Acceptable types of evidence are:
 - a. Report of laboratory testing performed in accordance with requirements.
 - b. Published product data showing compliance with requirements.
 - c. Certification by manufacturer that product complies with requirements.
- C. Flooring Systems used on the interior of the building (defined as inside the weatherproofing system):
1. Provide flooring systems that comply with the most stringent requirements specified in the following:
 - a. Carpet installed in the building shall meet one of the following requirements:
 - 1) Meets the testing and product requirements of the Carpet and Rug Institute (CRI) Green Label Plus Program.
 - 2) Maximum VOC concentrations are less than or equal to those specified in the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda, using the office scenario as defined in Table 7.5 within the practice. The additional VOC concentration limits listed in Section 9.1a must also be met.
 - 3) Maximum VOC concentrations meet the California requirements specified above based on the following:
 - a) California Department of Public Health (CDPH) Standard Method V1.1-2010 using test results obtained at the 14 day time point.
 - b. Carpet adhesive shall meet the requirements of IEQc4.1 Adhesives and Sealants, which includes a volatile organic compound (VOC) limit of 50g/L.
 - c. Hard surface flooring installed in the building shall meet one of the following requirements:
 - 1) Meet the requirements of the FloorScore standard (current as of the date of the reference rating system - 2009, or more stringent version) as shown with testing by an independent third-party.
 - d. Demonstrate Maximum VOC concentrations are less than or equal to those specified in the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda, using the office scenario as defined in Table 7.5 within the practice.
 - 1) Maximum VOC concentrations meet the California requirements specified above based on the following:
 - a) California Department of Public Health (CDPH) Standard Method V1.1-2010 using test results obtained at the 14 day time point.

- e. For carpet adhesive, concrete and wood floor finishes, and tile setting adhesives, compliance can be demonstrated with test results of:
 - 1) Total volatile fraction, based on one of the following, provided that water and exempt compounds are subtracted from total volatile test results and the mass VOC content is calculated consistent with SCAQMD Rule 1113 and Rule 1168.
 - a) ASTM D2369.
 - b) EPA method 24.
 - c) ISO 11890 part 1.
 - 2) Total volatile organic compounds fraction, based on one of the following, provided that all VOCs with a boiling point up to 280C (536F) are included, and exempt compounds are subtracted from total volatiles test results and the mass VOC content is calculated consistent with SCAQMD Rule 1113 and Rule 1168.
 - a) ASTM D6886.
 - b) ISO 11890 part 2.
- 2. OR, flooring elements installed in the building shall meet the testing and product requirements of the State of California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions From Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
- 3. Evidence of Compliance: Acceptable types of evidence are:
 - a. Published product data showing compliance with requirements.
- D. Composite Wood and Agrifiber Products used on the interior of the building (defined as inside the weatherproofing system):
 - 1. Provide products having no added urea-formaldehyde resins.
 - 2. Evidence of Compliance: Acceptable types of evidence are:
 - a. Report of laboratory testing performed in accordance with requirements.
 - b. Published product data showing compliance with requirements.
 - c. Certification by manufacturer that product complies with requirements.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

- A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.
- B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

END OF SECTION 01 6119

SECTION 01 6119.01 - ACCESSORY MATERIAL VOC CONTENT CERTIFICATION FORM

1.1 FORM

A. Identification:

1. Project Name: _____
2. Project No.: _____
3. Architect: _____

B. Use of This Form:

1. Because installers are allowed and directed to choose accessory materials suitable for the applicable installation, there is a possibility that such accessory materials might contain VOC content in excess of that permitted, especially where such materials have not been explicitly specified.
2. Contractor is required to obtain and submit this form from each installer of Work on this Project.
3. For each product category listed, circle the correct words in brackets: either [HAS] or [HAS NOT].
4. If any of these accessory materials has been used, attach to this form product data and MSDS sheet for each such product.

C. VOC content restrictions are specified in Section 01 6119 "Volatile Organic Compound (VOC) Content Restrictions".

1.2 PRODUCT CERTIFICATION

A. I certify that the installation work of my firm on this project:

1. [HAS] [HAS NOT] required the use of any ADHESIVES.
2. [HAS] [HAS NOT] required the use of any JOINT SEALANTS.
3. [HAS] [HAS NOT] required the use of any PAINTS OR COATINGS.
4. [HAS] [HAS NOT] required the use of any COMPOSITE WOOD or AGRIFIBER PRODUCTS.

B. Product data and MSDS sheets are attached.

1.3 CERTIFIED BY: (INSTALLER/MANUFACTURER/SUPPLIER FIRM)

- A. Firm Name: _____
- B. Print Name: _____
- C. Signature: _____
- D. Title: _____ (officer of company)
- E. Date: _____

END OF SECTION 01 6119.01

SECTION 01 7000 - EXECUTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Protection of installed construction.
- C. Correction of the Work.
- D. Progress cleaning.

1.2 RELATED REQUIREMENTS

- A. Section 01 1000 "Summary" for Owner-furnished work.
- B. Section 01 4000 "Quality Requirements" for installation layout control, where applicable to Project.

1.3 REFERENCE STANDARDS

- A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations.

1.4 QUALITY ASSURANCE

- A. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

1.5 PROJECT CONDITIONS

- A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where applicable, 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, plumbing, fire suppression and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - a. Verify that utility services are available, of the correct characteristics, and in the correct locations.
 - 4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - a. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
 - 5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings in substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.
- D. 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.
- E. Verify space requirements and dimensions of items shown diagrammatically on Drawings.

- F. Review Contract Documents and field conditions. Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of the Contractor, submit a request for information to Architect according to requirements in Section 01 3000 "Administrative Requirements".

3.3 LAYING OUT THE WORK

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect of any discrepancies discovered.
- C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- D. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
- F. Utilize recognized engineering survey practices.
- G. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
 - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
 - 2. Grid or axis for structures.
 - 3. Building foundation, column locations and ground floor elevations.
- H. Periodically verify layouts by same means.
- I. Maintain a complete and accurate log of control and survey work as it progresses.
- J. Provide evidence of completion of clash detection with other trades prior to commencement of work.

3.4 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
 - 2. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
 - 3. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
 - 4. Make neat transitions between different surfaces, maintaining texture and appearance.
 - 5. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 6. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.

7. The Architect may make minor adjustments in fixture, outlet, grille, louver, or ventilator locations prior to rough-in work with no additional cost.
- B. Installer Inspections: Require installer of each major unit of work to inspect substrate and conditions for installation and to report unsatisfactory conditions in writing.
 1. Correct unsatisfactory conditions before proceeding with installation.
 2. Inspect each product immediately before installation.
 3. Do not install damaged or defective products, materials or equipment.
 4. Start of installation shall be understood as acceptance of substrate conditions by the installer.
- C. Clearances: Provide adequate clearance between Architectural, Structural, Mechanical and Electrical systems. Verify physical dimensions of equipment and its available space. Check access routes through concealed or existing spaces for installation of systems or equipment.
 1. Review the Contract Documents for possible conflicts prior to rough-in. Verify that equipment will fit in the space provided. Resolve conflicts with the Architect prior to rough-in work.
- D. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- E. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- F. 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.
- G. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- H. 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.
- I. Attachment: Provide blocking, attachment plates, anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 2. Allow for building movement, including thermal expansion and contraction.
 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- J. 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.

- K. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Protect installed Work and provide special protection where specified in individual specification Sections.
- B. Provide temporary and removable protection for installed products. Control activity in immediate work area to minimize damage.
- C. Provide and maintain temporary shoring and lateral bracing of structure during erection to resist all loads including:
 - 1. Wind.
 - 2. Seismic.
 - 3. Construction.
 - 4. Materials.
 - 5. Moving equipment.
- D. Do not remove temporary bracing and shoring until adequate, permanent connections or structural elements are in final position and positively anchored.
- E. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- F. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- G. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- H. Prohibit traffic from landscaped areas.
- I. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- J. Comply with manufacturer's written instructions for temperature and relative humidity.

3.6 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.

3.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Utilize containers intended for holding waste materials of type to be stored.
 - 4. Daily cleaning shall include magnetic sweep of jobsite to pick up all nails and metallic debris.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 7419 "Construction Waste Management and Disposal".
- 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.

END OF SECTION 01 7000

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SECTION 01 7419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 WASTE MANAGEMENT REQUIREMENTS

- A. Owner requires that this project generate the least amount of trash and waste possible.
- B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
- C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
- D. Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration:
 - 1. Aluminum and plastic beverage containers.
 - 2. Corrugated cardboard.
 - 3. Wood pallets.
 - 4. Clean dimensional wood: May be used as blocking or furring.
 - 5. Land clearing debris, including brush, branches, logs, and stumps.
 - 6. Concrete.
 - 7. Bricks.
 - 8. Concrete masonry units.
 - 9. Metals, including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
 - 10. Glass.
 - 11. Gypsum drywall and plaster.
 - 12. Plastic buckets.
 - 13. Carpet, carpet cushion, carpet tile, and carpet remnants, both new and removed: DuPont (<http://flooring.dupont.com>) and Interface (www.interfaceinc.com) conduct reclamation programs.
 - 14. Asphalt roofing shingles.
 - 15. Paint.
 - 16. Plastic sheeting.
 - 17. Rigid foam insulation.
 - 18. Windows, doors, and door hardware.
 - 19. Plumbing fixtures.
 - 20. Mechanical and electrical equipment.
 - 21. Fluorescent lamps (light bulbs).
 - 22. Acoustical ceiling tile and panels.
 - 23. Roller shades.
 - 24. Reclaimed urban hardwoods from site trees to be removed.
- E. Methods of trash/waste disposal that are not acceptable are:
 - 1. Burning on the project site.

2. Burying on the project site.
3. Dumping or burying on other property, public or private.
4. Other illegal dumping or burying.
5. Incineration, either on- or off-site.

- F. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.2 RELATED REQUIREMENTS

- A. Section 01 3000 “Administrative Requirements” for additional requirements for project meetings, reports, and project documentation.
- A. Section 01 5000 “Temporary Facilities and Controls” for additional requirements related to trash/waste collection and removal facilities and services.

1.3 DEFINITIONS

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
- A. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
- B. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
- C. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
- D. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
- E. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- F. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- G. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- H. Return: To give back reusable items or unused products to vendors for credit.
- I. Reuse: To reuse a construction waste material in some manner on the project site.
- J. Salvage: To remove a waste material from the project site to another site for resale or reuse by the Owner or others, as determined by the Owner.

- K. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
- L. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- M. Toxic: Poisonous to humans either immediately or after a long period of exposure.
- N. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- O. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.
- P. Wood Reclaim and Reclamation: To remove a waste material from the project site to another site for resale or reuse by the Owner or others, as determined by the Owner.

PART 2 - PRODUCTS

2.1 RECYCLING AND SALVAGE PROCESSERS

- A. Refer to the Portland Metro recycling page: <http://www.oregonmetro.gov/tools-living/garbage-and-recycling/find-a-recycler>
- B. Deconstruction Services: Following are acceptable processors; Contractor is not limited to use of these companies.
 - 1. Corvallis Habitat ReStore: www.bentonhabitat.org/restore/.
 - 2. Lovett Deconstruction Inc.: www.lovettdeconstruction.com.
 - 3. ReBuilding Center, Portland, OR.: www.rebuildingcenter.org/deconstruction-services/.

PART 3 - EXECUTION

3.1 WASTE MANAGEMENT PROCEDURES

- A. Refer to Section 01 3000 "Administrative Requirements" for additional requirements for project meetings, reports, and project documentation.
- A. Refer to Section 01 5000 "Temporary Facilities and Controls" for additional requirements related to trash/ waste collection and removal facilities and services.

END OF SECTION 01 7419

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SECTION 01 7700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Substantial Completion.
- B. Final Completion.
- C. Punch List.
- D. Warranties.
- E. System startup.
- F. Adjusting.
- G. Final Cleaning.
- H. Maintenance.

1.2 RELATED REQUIREMENTS

- A. Section 01 7800 "Closeout Submittals": Project record documents, operation and maintenance (O&M) data, warranties and bonds.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting review for determining date of Substantial Completion, complete the following. List items below that are incomplete with request.
 - 1. In progress payment request coincident with or first following date claimed, show either 100 percent completion for portion of work claimed as "substantially complete", or list incomplete items, value of incompleteness, and reasons for being incomplete. Include supporting documentation for completion as indicated in these contract documents.
 - a. Submit statement showing accounting of changes to the Contract Sum.
 - b. 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 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 drafts for Operation and Maintenance Manuals.
 - 6. Prepare and submit drafts for Project Record Documents.

7. Prepare and submit damage or settlement surveys, property surveys, and similar final record information. Update to existing survey by qualified land surveyor and include with record drawings.
8. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable. Submit an itemized receipt, signed by Owner, to Architect.
9. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Advise Owner and utility companies 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.
15. Make submittals that are required by governing or other authorities.
 - a. Provide copies to Architect and Owner.
 - b. Provide copy of Occupancy Permit to Architect and Owner.

- B. Review: Submit a written request for review for Substantial Completion. On receipt of request, Architect will either proceed with review or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after review 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. Results of completed review will form the basis of requirements for Final Completion.
2. Should the Architect have to perform any additional reviews due to failure of Work to comply with claims of completion made by Contractor, the cost for each additional review will be charged to the Owner at the Architect/Engineer's hourly rate. The Owner shall have the right to deduct such charges from the contract amount as provided in the Conditions of the Contract.

1.4 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final review for determining final completion, complete the following:
1. Submit a final Application for Payment with final waivers according to the Contract.
 - a. Submit updated final statement, accounting for additional (final) changes to Contract Sum.
 2. Submit consent of surety.
 3. Prepare and submit final Project Record Documents within 30 days after date of Substantial Completion or before final completion, whichever occurs first.
 4. Submit final warranties.
 5. Submit final operation and maintenance manuals.

6. Submit certified copy of Architect's Substantial Completion review list of items to be completed or corrected (punch list). The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
8. Submit permanent unconditioned Certificate of Occupancy.
9. Submit payment and release of liens to requirements of General Conditions. Before final payment, the Contractor shall furnish the following to the Architect:
 - a. An affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner of property might in any way be responsible, have been paid or otherwise satisfied (use AIA Form G706 or approved by District).
 - b. An affidavit from each Subcontractor on AIA Form G706 or approved by District.
 - c. Letter from Bonding Company addressed to Owner but submitted to the Architect, approving release of final payment and waiving submission of final receipts as well as a statement confirming the extension of the Bond for the warranty period as specified. Final receipts from all subcontractors and material and equipment suppliers may be required to furnish to the Owner by the Contractor if the Surety does not waive this requirement. Letters to be in substantially the following form:

[Name of Owner]
Re: [Bond No.]
[Name of Contractor]
[Address]
[Name of Project]
To Whom It May Concern:

The [Name of Bonding Company], surety on the above named Bond, consents to payment of retained percentages and agrees to waive submission of final receipts.

It is also agreed that the final payment to the Contractor shall not relieve the Surety Company of any of its obligations and that the Bond is extended to include guarantees and warranties of workmanship and materials.

[NAME OF BONDING COMPANY]

Attorney-in-Fact
 - d. Submit Contractor's Affidavit of Release of Liens (AIA Form G706A or approved by Owner).
 - e. Return all copies of the Drawings and Specifications in accordance with the General Conditions.
10. Return to Owner all items issued during construction such as keys, security passes and identification badges.
11. Complete startup testing of systems.
12. Submit test/adjust/balance records.
13. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

14. Submit attendance record for training of Owner's personnel.
15. Complete requirements of Section 01 78 00 "Closeout Submittals".

B. Review: Submit a written request for final review for acceptance. On receipt of request, Architect will either proceed with review or notify Contractor of unfulfilled requirements. Architect will either prepare a letter to Owner recommending final acceptance or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Additional Reviews: Request an additional review when the Work identified in previous reviews as incomplete is completed or corrected.
2. Should the Architect have to perform any such additional reviews due to failure of Work to comply with claims of completion made by Contractor, the cost for each additional review will be charged to the Owner at the Architect/Engineer's hourly rate. The Owner shall have the right to deduct such charges from the contract amount as provided in the Conditions of the Contract.
3. Provide additional cleaning services as required for Work which was not complete at the time of initial review. Reclean as required until all Work is fully complete and recommended for final acceptance by Architect.
4. If the Work does not achieve Final Completion within two weeks of the date originally scheduled to do so, plus any time adjustments by Change Order, the Architect's time and efforts beyond that period shall constitute extra services, the cost of which at the Architect's standard hourly rates will be deducted from the Contractor's Final Payment or retainage by the Owner.
5. Punch list items in the Schedule of Values will be released on any given line item only when all punchlist items relating to that line item are satisfactorily completed.

1.5 CONTRACTOR'S LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Prior to requesting review for Substantial Completion, perform a thorough punch list of the project identifying incomplete items, damaged items and substandard items requiring correction.

1. Distribute the Punch List to applicable subcontractors and indicate corrections made to each item.
2. Reinspect and sign off on all complete items.
3. This Punch List will form the basis of the list to be submitted with the request for Substantial Completion.
4. Supplement Punch List with valuation of incomplete items and reasons for being incomplete.
5. Prepare Punch List in digital format acceptable to Architect.

B. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.
4. Submit list of incomplete items in the following format:
 - a. Portable Document Format (PDF)-type file.

1.6 WARRANTIES

- A. Submittal Time:
 1. Submit summary of warranties included in the bid within seven days after Notice of Intent to Award Contract (Prior to Execution of the Contract). Indicate duration of each warranty and start date.
 2. Submit sample warranties as part of the project submittal process.
 3. Submit final warranties before requesting review for final acceptance.
- B. Comply with requirements of Section 01 7800 "Closeout Submittals."

PART 2 - PRODUCTS

2.1 MATERIALS

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

PART 3 - EXECUTION

3.1 SYSTEM STARTUP

- A. Coordinate schedule for start-up and functional testing of various equipment and systems.
- B. Notify Architect and Owner seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.

- F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- G. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units and retest.
- H. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- I. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.2 ADJUSTING

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

3.3 CLEANING PRIOR TO SUBSTANTIAL COMPLETION REVIEW

- A. At time of project close-out, clean or reclean the Work to the condition expected from a normal, commercial building cleaning and maintenance program.
- B. Complete the following cleaning operations before requesting the Architect's review for certification of Substantial Completion.
 - 1. Remove grease, dust, dirt, stains, manufacturer's labels, fingerprints, etc. from sight exposed surfaces.
 - 2. Remove non-permanent protection and labels.
 - 3. Wash and polish all interior and exterior glazing and mirrors.
 - 4. Repair, patch and touch-up marred surfaces.
 - 5. Clean heating and cooling ducts, blowers, coils, fixtures, equipment, piping, and grilles.
 - 6. Replace disposable air filters and clean permanent filters.
 - 7. Remove construction debris.
 - 8. Flush water systems and disinfect domestic water lines. Sanitize plumbing and food service facilities.
 - 9. Broom clean new exterior paved surfaces and walks. Vacuum clean interior carpeted surfaces and wet mop hard floor surfaces.
 - 10. Clean light fixtures and replace burned-out lamps and replace damaged lenses.
 - 11. Police yards and grounds.

3.4 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and anti-pollution 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 review 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.
 - 1) Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates.
 - m. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - n. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
 - o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grilles.
 - q. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter upon inspection.
 - r. 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 fixtures to comply with requirements for new fixtures.

s. Leave Project clean and ready for occupancy.

2. Maintain in cleaned condition until Final Completion or Owner occupancy.

3.5 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
- E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION 01 7700

SECTION 01 7800 - CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Project Record Documents.
- B. Operation and Maintenance Manuals.
- C. Warranties and bonds.

1.2 RELATED REQUIREMENTS

- A. Section 01 3000 "Administrative Requirements": Submittals procedures, shop drawings, product data, and samples.
- B. Section 01 7700 "Closeout Procedures": Contract closeout procedures.
- C. Individual Specification Sections: Specific requirements for operation and maintenance data.
- D. Individual Specification Sections: Warranties required for specific products or Work.

1.3 SUBMITTALS

A. Record Drawings:

- 1. Draft: Submit one copy of marked-up record prints in electronic color PDF format prior to request for review for Substantial Completion.
- 2. Final: Submit an electronically scanned copy of marked up prints within thirty (30) calendar days of dated established for Substantial Completion or prior to request for review for final completion, whichever occurs first.
- 3. Approved permit set of plans.
- 4. Provide all electronic files and documents required by the BIM Execution Plan if applicable.

B. Record Specifications:

- 1. Draft: Submit one copy of marked-up copy of Project Manual in electronic color portable document format (PDF) type file prior to request for review for Substantial Completion.
- 2. Final: Submit one electronically scanned marked-up copy of Project Manual within thirty (30) calendar days of date established for Substantial Completion or prior to request for review for final completion, whichever occurs first.

C. Operation and Maintenance Manuals:

- 1. Draft: Submit one copy of draft manuals in electronic color PDF format prior to request for review for Substantial Completion. Architect will review draft and return one copy with comments. Revise content of all document sets as required prior to final submission.

2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
3. Final: Submit an electronically scanned copy in final form prior to request for review for final completion.

D. Warranties and Bonds:

1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
2. Draft: Submit as part of normal submittal process.
3. Final: Submit final forms of warranties prior to request for review for final completion.

E. PDF Format: Submit searchable hyper-linked PDF electronic files. File names shall clearly identify the Owner, project name, drawing or specification number and name and date. File name shall be established to list in the same order as identified in the Contract Documents.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 PROJECT RECORD DOCUMENTS

A. Maintain on-site one (1) complete set of the following record documents; record actual revisions to the Work:

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and Construction Change Directives.
5. ASIs and responses to RFIs.
6. Manufacturer's instruction for assembly, installation, and adjusting.
7. Architect will provide one hard copy (if applicable) and one hyper-linked PDF electronic file of a conformed set of Contract Documents (both drawings and specifications), that have been extracted directly from the Revit model incorporating addenda for use by Contractor in developing and maintaining Record Drawings.

a. Architect will provide initial linking of the PDF including at a minimum:

- 1) Hyperlinked Table of Contents for both drawings and specifications.
- 2) Bluebeam Studio (or approved other) initiated for use by project teams.

B. The record documents shall include all disciplines of work whether changes occur or not. These documents, as well as the approved permit set of plans, shall be available to the Architect and Owner at the site and reviewed with them on a monthly basis. The record documents will be maintained by the Contractor and shall incorporate all updates from Subcontractors and their scope of work. Satisfactory maintenance of up-to-date record drawings on a monthly basis will be a requirement for approval of progress payments.

- C. The dynamic PDF will be used as the most current and up-to-date approved set of documents for access by the entire project team.
- D. 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.
- E. Record Drawings: Once received, continue to hyperlink the drawings and specifications to include at a minimum:
 - 1. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations below first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Addenda.
 - k. Changes made by Change Order or Construction Change Directive.
 - l. Changes made following Architect's written orders, including ASIs and responses to RFIs.
 - m. Details not on the original Contract Drawings.
 - n. Field records for variable and concealed conditions.
 - 1) Include pre-cover photographs of every room and include link to the dynamic PDF.
 - o. Record information on the Work that is shown only schematically.
 - p. Drawing details linked within drawings, all building section details and other details will be linked within the interactive PDF to allow easy navigation.
 - 2. Record drawings shall include, as a minimum, the location and performance data on each piece of equipment, detailed configuration of duct and pipe distribution system, including sizes, and the terminal air and water design flow rates updated to show approved balancing of systems.
 - 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Utilize personnel proficient at recording graphic information in production of marked-up record prints. Bluebeam Studio, or approved other, shall be utilized for collaboration and approval of marked-up record documents.
 - 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 - 5. Mark important additional information that was either shown schematically or omitted from original Drawings.

6. Mark revisions and/or clarifications issued by Addenda, ASI, Construction Change Directive, Change Orders or responses to RFIs to reflect the change. Each such revision shall be graphically depicted to represent physical construction and clearly noted with the applicable Addenda, ASI, Change Order or RFI number. Notation of the Addenda, RFI, ASI, Construction Change Directive or Change Order number alone will not be acceptable. All originating documents shall be linked and accessible within the dynamic PDF drawings.
 7. Ensure entries are complete and accurate, enabling future reference by Owner.
 8. Scanned Drawings: After review of draft drawings by Architect, incorporate necessary changes and prepare a full set of scanned Contract Drawings and Shop Drawings on CD-ROM or USB flash drive.
- F. Specifications: Legibly mark and record at each product section a description of actual products installed, including the following:
1. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 2. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 3. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals.
 4. Mark revisions and/or clarifications issued by Addenda, ASI, Construction Change Directive, Change Orders or responses to RFIs to reflect the change. Each such revision shall be graphically depicted to represent physical construction and clearly noted with the applicable Addenda, ASI, Change Order or RFI number. Notation of the Addenda, RFI, ASI, Construction Change Directive or Change Order number alone will not be acceptable.
 5. Format: Submit record Specifications as approved record PDF electronic file(s) of the Specifications.

3.2 OPERATION AND MAINTENANCE DATA

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.3 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
 1. 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.
 - 2. Product data, with catalog number, size, composition, and color and texture designations.
 - 3. Information for re-ordering custom manufactured products.
 - B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
 - C. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
 - D. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
 - E. Additional information as specified in individual product specification sections.
 - F. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- 3.4 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS
- A. For Each Item of Equipment and Each System:
 - 1. Description of unit or system, and component parts.
 - 2. Identify function, normal operating characteristics, and limiting conditions.
 - 3. Include performance curves, with engineering data and tests.
 - 4. Complete nomenclature and model number of replaceable parts.
 - B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
 - C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
 - D. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
 - E. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
 - F. Provide servicing and lubrication schedule, and list of lubricants required.
 - G. Include manufacturer's printed operation and maintenance instructions.
 - H. Include sequence of operation by controls manufacturer.

- I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- J. Provide control diagrams by controls manufacturer as installed.
- K. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- L. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- M. Include test and balancing reports.
- N. Additional Requirements: As specified in individual product specification sections.
- O. Hold several meetings with Owner, Architect and Contractor to determine Operations and Maintenance (O&M) data to be included and linked to the dynamic PDF.

3.5 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. Assemble operation and maintenance data into electronic copies for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate electronic "folders" for each system.
- C. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- D. Tables of Contents: List every item separated by a folder, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- E. Text: Manufacturer's printed data.
- F. Drawings: Provide with reinforced punched binder tab. Bind in with text. 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.
- G. Arrangement of Contents: Organize each volume in parts as follows:
 - 1. Project Directory.
 - 2. Table of Contents, of all volumes, and of this volume.
 - 3. Operation and Maintenance Data: Arranged by system, then by product category.
 - a. Source data.
 - b. Product data, shop drawings, and other submittals.
 - c. Operation and maintenance data.
 - d. Field quality control data.
 - e. Photocopies of warranties and bonds.

4. Design Data: To allow for addition of design data furnished by Architect or others, provide a tab labeled "Design Data" and provide a binder large enough to allow for insertion of at least 20 pages of typed text.
- H. PDF Electronic File: After review of draft manuals, assemble each manual into a composite electronically-indexed file. Submit on digital media acceptable to Architect.
 1. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically-linked operation and maintenance directory.
 2. Enable inserted reviewer comments on draft submittals.
 3. File Names and Bookmarks: Enable bookmarking of individual documents based upon 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 upon opening file.
 4. Incorporate O&M data to be included and linked to the dynamic PDF.

3.6 WARRANTIES AND BONDS

- A. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.
- B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
 1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
 2. The Owner reserves the right to refuse to accept or pay for Work for the Project where a Special Warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

- E. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Completion is determined.
- F. Verify that documents are in proper form and contain full information.
- G. Co-execute submittals when required.
- H. Retain warranties and bonds until time specified for submittal.
- I. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.
- J. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.
- K. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
 - 1. Product or work item.
 - 2. Installer of product or item, with name of principal, address, and telephone number.
 - 3. Describe the work provided by this installer/Subcontractor, under this Contract.
 - 4. Date of beginning of warranty or service and maintenance contract. (See General Condition's Warranty paragraph.)
 - 5. Duration of warranty or service maintenance contract.
 - 6. Information for Owner's personnel, including:
 - a. Proper procedure in case of failure.
 - b. Contact phone numbers of manufacturer.
 - 7. Instances that might affect validity of warranty or bond.
 - 8. Contractor, name of responsible principal, address, and telephone number.
- L. Schedule of Warranties: Provide a summary schedule of start and end date of each warranty.
- M. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION 01 7800

SECTION 01 7900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Demonstration of products and systems to be commissioned and where indicated in specific specification sections.
- B. Training of Owner personnel in operation and maintenance is required for:
 - 1. All software-operated systems.
 - 2. HVAC systems and equipment.
 - 3. Plumbing equipment.
 - 4. Electrical systems and equipment.
 - 5. Conveying systems.
 - 6. Landscape irrigation.
 - 7. Common Areas access control.
 - 8. Parking Areas access and revenue controls.
 - 9. Other components where indicated in individual product Sections.
- C. Training of Owner personnel in care, cleaning, maintenance, and repair is required for:
 - 1. Roofing, waterproofing, and other weather-exposed or moisture protection products.
 - 2. Finishes, including flooring, wall finishes and ceiling finishes.
 - 3. Fixtures and fittings.
 - 4. Other components where indicated in individual product Sections.
- D. Related Requirements:
 - 1. Section 01 7800 "Closeout Submittals" for operation and maintenance manuals.
 - 2. Section 01 9113 "General Commissioning Requirements" for additional requirements applicable to demonstration and training.
 - 3. Other Specification Sections: Additional requirements for demonstration and training.

1.3 SUBMITTALS

- A. See Section 01 3000 "Administrative Requirements" for submittal procedures; except:
 - 1. Make all submittals specified in this section, and elsewhere where indicated for commissioning purposes, directly to the Commissioning Authority.
 - 2. Submit one copy to the Commissioning Authority, not to be returned.
 - 3. Make commissioning submittals on time schedule specified by Commissioning Authority.

4. Submittals indicated as "Draft" are intended for the use of the Commissioning Authority in preparation of overall Training Plan; submit in editable electronic format, Microsoft Word 2003 preferred.
- B. Draft Training Plans: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.
1. Submit to Commissioning Authority for review and inclusion in overall training plan.
 2. Submit not less than four weeks prior to start of training.
 3. Revise and resubmit until acceptable.
 4. Provide an overall schedule showing all training sessions.
 5. Include at least the following for each training session:
 - a. Identification, date, time, and duration.
 - b. Description of products and/or systems to be covered.
 - c. Name of firm and person conducting training; include qualifications.
 - d. Intended audience, such as job description.
 - e. Objectives of training and suggested methods of ensuring adequate training.
 - f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
 - g. Media to be used, such as slides, hand-outs, etc.
 - h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.
- C. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
1. Include applicable portion of O&M manuals.
 2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
 3. Provide one extra copy of each training manual to be included with operation and maintenance data. Provide in electronic Portable Document Format (PDF) as well, on USB storage device.
- D. Training Videos: Record video of each training session and provide a training video for each attendee for their training session; allow for minimum of two attendees per training session.
1. Provide in one of the following video formats, or other supported by Google YouTube; www.support.google.com/youtube.
 - a. Audio Video Interleaved/ AVI (.avi).
 - b. ISO/IEC Moving Picture Experts Group/ MPEG-4 (.mp4).
 - c. Program stream/ MPEGPS (.mpg).
 - d. QuickTime/ MOV (.mov).
 - e. Windows Media Video/ WMV (.wmv).

1.4 QUALITY ASSURANCE

- A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
 - 1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
 - 2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 DEMONSTRATION - GENERAL

- A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.
- B. Demonstrations conducted during Functional Testing need not be repeated unless Owner personnel training is specified.
- C. Demonstration may be combined with Owner personnel training if applicable.
- D. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
 - 1. Perform demonstrations not less than two weeks prior to Substantial Completion.
 - 2. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- E. Non-Operating Products: demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
 - 1. Perform demonstrations not less than two weeks prior to Substantial Completion.

3.2 TRAINING - GENERAL

- A. Commissioning Authority will prepare the Training Plan based on draft plans submitted.
- B. Conduct training on-site unless otherwise indicated.
- C. Owner will provide classroom and seating at no cost to Contractor.
- D. Do not start training until Functional Testing is complete, unless otherwise specified or approved by the Commissioning Authority.

- E. Provide training in minimum two hour segments.
- F. The Commissioning Authority is responsible for determining that the training was satisfactorily completed and will provide approval forms.
- G. Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.
- H. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
 - 1. The location of the O&M manuals and videos, and procedures for use and preservation; backup copies.
 - 2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
 - 3. Typical uses of the O&M manuals and videos.
- I. Product- and System-Specific Training:
 - 1. Review the applicable O&M manuals and videos.
 - 2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
 - 3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.
 - 4. Provide hands-on training on all operational modes possible and preventive maintenance.
 - 5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
 - 6. Discuss common troubleshooting problems and solutions.
 - 7. Discuss any peculiarities of equipment installation or operation.
 - 8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
 - 9. Review recommended tools and spare parts inventory suggestions of manufacturers.
 - 10. Review spare parts and tools required to be furnished by Contractor.
 - 11. Review spare parts suppliers and sources and procurement procedures.
- J. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

END OF SECTION 01 7900

SECTION 01 9113 - GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Commissioning is intended to achieve the following specific objectives; this Section specifies the various parties' responsibilities to participate in the commissioning process:
 - 1. Verify that the work is installed in accordance with the Contract Documents and the manufacturer's recommendations and instructions and, that it receives adequate operational checkout prior to startup. Startup reports and Prefunctional Checklists executed by Contractor are utilized to achieve this. Commissioning Authority (CxA) will review Contractor start-up reports and pre-functional checklists for completeness.
 - 2. Verify that all systems requiring commissioning as listed in the Commissioning Request for Proposal are tested and perform in accordance with the Owner's Project Requirements (OPR) and Basis of Design (BOD).
 - 3. Verify and document that functional performance is in accordance with the Contract Documents: Functional Tests which are performed by Contractor and witnessed by the Commissioning Authority are utilized to achieve this.
 - 4. Verify that operation and maintenance manuals submitted to Owner are complete: Detailed operation and maintenance (O&M) data submittals by Contractor are utilized to achieve complete O&M Manuals.
 - 5. Verify that the Owner's operating personnel are adequately trained: Formal training conducted by Contractor is utilized to achieve personnel training.
- B. The Commissioning Authority directs and coordinates commissioning activities. This Section describes some but not necessarily all the Commissioning Authority's responsibilities.
- C. The contractor(s) understand that their participation in commissioning activities is required. The contractor(s) shall include the costs of such participation in their bids and shall not request additional costs for their participation.
- D. The Commissioning Authority is an independent 3rd party employed by Owner.
- E. Scope of Commissioning: The following are to be commissioned:
 - 1. Items noted with an asterisk (*) will have primary commissioning provided by vendor or installing contractor, with oversight/coordination with the Commissioning Authority. Refer to specific specification sections requiring sub-contractor/vendor testing plans and test reporting.
 - 2. HVAC System, including:
 - a. Testing and Balancing (TAB).
 - b. Air handling units, including fans, coils, filters, dampers and VFD's.
 - c. Process and general exhaust fans.
 - d. Split-system air conditioning units.
 - e. Heat recovery equipment.
 - f. Hydronic pumps.

- g. Chiller and related appurtenances.
 - h. Heating water boilers and related appurtenances.
 - i. Hydronic piping systems and equipment (pressure tests and flushing).
 - j. Ductwork distribution and accessories (pressure tests and cleanliness).
 - k. Terminal units.
 - l. Automatic control system.
 - m. Variable frequency drives.
 - n. *Fire/smoke dampers. To be tested as part of overall fire/life safety systems by AHJ.
 - 3. Plumbing Systems:
 - a. Domestic water heaters, recirculation pumps and expansion tanks.
 - b. Elevator sump pumps.
 - c. Plumbing piping distribution (pressure tests, flushing and chlorination)
 - d. Make-up water stations for hydronic piping systems.
 - e. Plumbing fixture operation. Verification is by installing contractor.
 - f. Master mixing valve.
 - g. Landscape irrigation system.
 - 4. Fire protection systems. Note that Commissioning will involve CxA “shadowing” fire marshal or other 3rd party inspector or authority having jurisdiction (AHJ) on a sampling basis and reviewing final report from same.
 - a. Wet pipe sprinkler systems.
 - b. Dry pipe sprinkler systems.
 - c. Zone valves
 - d. Interaction with fire alarm system.
 - 5. Electrical Systems:
 - a. Lighting control systems.
 - b. Emergency power system.
 - c. Fire alarm system. Note that commissioning will be done by CxA shadowing AHJ and review of AHJ approval report.
 - 6. Electronic Safety and Security: Security and access controls.
 - a. Security systems, including active and passive equipment.
 - 7. Other equipment and systems explicitly identified elsewhere in Contract Documents as requiring commissioning.
- F. Related Requirements:
- 1. Section 01 5721 “Indoor Air Quality Controls”: SMACNA IAQ Guidelines for Occupied Buildings under Construction.
 - 2. Section 01 7700 “Closeout Procedures”: Scope and procedures for operation and maintenance manuals and project record documents.
 - 3. Testing requirements called out in Mechanical, Plumbing and Electrical specifications: These test protocols are intended to be produced and performed by the respective contractor or Vendor.

1.2 COMMISSIONING SPECIFICATION STATUS

- A. The commissioning specifications are by necessity produced before all project parameters are known. The specifications are dynamic and will be further developed and refined, as systems and equipment types are more accurately defined. The intent of the initial specifications is to establish a level of expectation regarding the systems requiring formal commissioning, and the types of testing to be anticipated during the commissioning process. The final commissioning specifications will be coordinated with actual equipment, details, sequences of operation, etc.

1.3 SHOP DRAWINGS, PRODUCT DATA, SAMPLES

- A. See Section 01 3000 "Administrative Requirements" for submittal procedures; except:
 - 1. Provide submittal schedule to CxA for equipment and systems to be commissioned. CxA will identify specific submittals required for commissioning purposes. Note that the CxA does not approve submittals but will review them in tandem with the design team.
 - 2. Submittal to CxA may be done by electronic means.
 - 3. Submittals indicated as "Draft" may be used by the Commissioning Authority in preparation of Prefunctional Checklists or Functional Test requirements.
 - 4. As soon as possible after submittals made to design team are approved, submit copy of approved submittal to the Commissioning Authority.
- B. Manufacturers' Instructions: For equipment that is to be commissioned, submit copies of all manufacturer-provided Installation, Operations and Maintenance (IOM) instructions that are shipped with the equipment as soon as the equipment is delivered. Provide anticipated schedule for delivering all IOM information to Commissioning Authority.
- C. Product Data: If submittals to Architect do not include the following, submit copies as soon as available to Commissioning Authority:
 - 1. Manufacturer's product data, cut sheets, and shop drawings.
 - 2. Manufacturer's installation instructions.
 - 3. Startup, operating, and troubleshooting procedures.
 - 4. Fan and pump curves.
 - 5. Factory test reports.
 - 6. Warranty information, including details of Owner's responsibilities regarding keeping warranties in force.
- D. Startup Plans and Reports.
- E. Completed Prefunctional Checklists

1.4 COORDINATION

- A. Commissioning Team: The members of the commissioning team consist of the Commissioning Authority (CxA), the Owner's designated Project Manager (PM), the General Contractor (GC or Contractor), the Architect and design Engineers, the plumbing contractor (PC), the mechanical contractor (MC), the electrical contractor (EC), the testing and balancing (TAB) representative, the Controls Contractor (CC), any other installing subcontractors or suppliers of equipment. If known, the Owner's building or plant operator/engineer is also a member of the commissioning team.

- B. Management: The CxA is hired by the Owner directly. The CxA directs and coordinates the commissioning activities. All members work together to fulfill their contracted responsibilities and meet the objectives of the Contract Documents. The CxA's responsibilities are the same regardless of who hired the CxA.
- C. Scheduling: The CxA will work with the GC according to established protocols to schedule the commissioning activities. The CxA will provide sufficient notice to the PM and GC for scheduling commissioning activities. The GC shall integrate commissioning activities into the master schedule. All parties shall address scheduling on an ongoing basis and make necessary notifications in a timely manner to expedite the commissioning process.
 - 1. The subcontractors shall provide adequate notice to the CxA regarding their completion schedule for the prefunctional checklists and startup of equipment and systems. The CC will provide written notification that they have completed required prefunctional checklists, point-to-point verification, sensor calibration verification, programming verification checks, and that their system(s) are complete and ready for functional testing before testing will proceed. The CxA will schedule functional tests through the PM, GC and affected Subs. The CxA will develop, execute and document the functional testing of equipment and systems required to be tested.
- D. Meetings:
 - 1. Scoping Meeting: During the beginning phases of construction, prior to MEP rough in, CxA will schedule, plan and conduct a commissioning scoping meeting with entire commissioning team in attendance. Information gathered from this meeting will be used by CxA to revise the Draft Commissioning Plan to its "final" version.
 - 2. Miscellaneous Meetings: CxA may attend regular construction meetings to keep informed of project progress and coordinate the commissioning activities. Other meetings will be planned and conducted by the CxA as construction progresses. These meetings will cover coordination, deficiency resolution and planning issues with particular Subs. The CxA will plan these meetings and will minimize unnecessary time being spent by Subs.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

- A. Provide all standard testing equipment required to perform startup and initial checkout and required Functional Testing; unless otherwise noted such equipment will NOT become the property of Owner.
- B. Calibration Tolerances: Provide testing equipment of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified. If not otherwise noted, the following minimum requirements apply:
 - 1. Temperature Sensors and Digital Thermometers: Certified calibration within past year to accuracy of 0.5-degree F and resolution of plus/minus 0.1-degree F.
 - 2. Pressure Sensors: Accuracy of plus/minus 2.0 percent of the value range being measured (not full range of meter), calibrated within the last year.
 - 3. Calibration: According to the manufacturer's recommended intervals and when dropped or damaged; affix calibration tags or keep certificates readily available for inspection.

- C. Equipment-Specific Tools: Where special testing equipment, tools and instruments are specific to a piece of equipment, are only available from the vendor, and are required to accomplish startup or Functional Testing, provide such equipment, tools, and instruments as part of the work at no extra cost to Owner.
- D. Dataloggers: Independent equipment and software for monitoring flows, currents, status, pressures, etc. of equipment.
 - 1. Dataloggers required to for Functional Tests will be provided by the Commissioning Authority and will not become the property of Owner.

PART 3 - EXECUTION

3.1 COMMISSIONING PLAN

- A. Commissioning Authority is in the process of preparing the Commissioning Plan. The required contractors shall:
 - 1. Attend meetings called by the Commissioning Authority for purposes of completing the commissioning plan.
 - 2. Require attendance and participation of relevant subcontractors, installers, suppliers, and manufacturer representatives, as needed.
 - 3. Attend all periodic commissioning meetings.
- B. Contractor is responsible for compliance with the Commissioning Plan.
- C. Commissioning Plan: The commissioning schedule, procedures, and coordination requirements for all parties in the commissioning process.
- D. Commissioning Schedule:
 - 1. Contractor to submit schedule of anticipated dates of startup for each item of equipment and system to be commissioned, to Commissioning Authority within 60 days after award of Contract.
 - 2. Re-submit anticipated startup dates monthly, but not less than 4 weeks prior to startup.
 - 3. Prefunctional Checklists and Functional Tests are to be performed in sequence from components, to subsystems, to systems.
 - 4. Provide sufficient notice to Commissioning Authority for delivery of relevant Checklists and Pre-Functional Test (PFT) procedures, to avoid delay.

3.2 STARTUP PLANS AND REPORTS

- A. The Contractor is responsible to produce an overall startup plan for all equipment and systems to be commissioned. This shall include anticipated startup dates for all equipment. The CxA and Contractor shall work together to develop this schedule.
- B. Startup Plans: For each item of equipment and system for which the manufacturer provides a startup plan, submit the plan not less than 8 weeks prior to startup.

- C. Startup Reports: For each item of equipment and system for which the manufacturer provides a startup checklist (or startup plan or field checkout sheet), document compliance by submitting the completed startup checklist prior to startup, signed and dated by responsible entity.
- D. Submit directly to the Commissioning Authority.

3.3 PREFUNCTIONAL CHECKLISTS

- A. A Prefunctional Checklist is required to be filled out for each item of equipment or other assembly specified to be commissioned.
 - 1. The Commissioning Authority will provide all prefunctional checklists. The contractor shall review all checklists and comment on completeness and applicability.
 - 2. The Contractor shall perform all PFT's for each piece of equipment identified. No sampling of identical or near-identical items is allowed.
 - 3. These checklists do not replace manufacturers' recommended startup checklists, regardless of apparent redundancy.
 - 4. Prefunctional Checklist forms will not be complete until after award of the contract; the following types of information will be gathered via the completed Checklist forms:
 - a. Certification by installing contractor that the unit is properly installed, started up, and operating and ready for Functional Testing.
 - b. Confirmation of receipt of each shop drawing and commissioning submittal specified, itemized by unit.
 - c. Manufacturer, model number, and relevant capacity information; list information "as specified," "as submitted," and "as installed."
 - d. Serial number of installed unit.
 - e. List of inspections to be conducted to document proper installation prior to startup and Functional Testing; these will be primarily static inspections and procedures; for equipment and systems may include normal manufacturer's start-up checklist items and minor testing.
 - f. Sensor and actuator calibration information.
- B. Contractor is responsible for filling out Prefunctional Checklists, after completion of installation and startup; witnessing by the Commissioning Authority is required on a sampling basis. Refer to sampling rates in Commissioning Plan (to follow).
 - 1. Each line item without deficiency is to be witnessed, initialed, and dated by the actual witness; checklists are not complete until all line items are initialed and dated complete without deficiencies.
 - 2. Checklists with incomplete items may be submitted for approval provided the Contractor attests that incomplete items do not preclude the performance of safe and reliable Functional Testing; re-submission of the Checklist is required upon completion of remaining items.
 - 3. Individual Checklists may contain line items that are the responsibility of more than one installer; Contractor shall assign responsibility to appropriate installers or subcontractors, with identification recorded on the form.
 - 4. If any Checklist line item is not relevant, record reasons on the form.
 - 5. Contractor may independently perform startup inspections and/or tests, at his option. However, no Functional Performance Test will be conducted on any system until all start-up and prefunctional test reports are submitted to and approved by CxA.

6. Regardless of these reporting requirements, Contractor is responsible for correct startup and operation.
 7. Submit completed Checklists to Commissioning Authority within five days of completion.
- C. Commissioning Authority is responsible for furnishing the Prefunctional Checklists to the Contractor.
1. Initial Drafts: CxA is responsible for initial draft of Prefunctional Checklists for commissioned equipment.
 2. Provide all additional information requested by Commissioning Authority to aid in preparation of checklists, such as shop drawing submittals, manufacturers' startup checklists, and O&M data.
 3. Commissioning Authority may include any relevant items deemed necessary regardless of whether they are explicitly mentioned in the Contract Documents or not.
 4. When asked to review the proposed Checklists, do so in a timely manner.
- D. Commissioning Authority Witnessing:
1. One piece of each primary equipment, unless sampling of multiple similar units is allowed by the commissioning plan. The intent is that the CxA be able to witness the start-up of one each of the major equipment items.
 2. A sampling of non-primary equipment, as allowed by the commissioning plan.
- E. Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to Owner.
1. If difficulty in correction would delay progress, report deficiency to the Commissioning Authority immediately.
- 3.4 FUNCTIONAL TESTS
- A. A Functional Test is required for each item of equipment, system, or other assembly specified to be commissioned, unless sampling of multiple identical or near-identical units is allowed by the final test procedures. Note that certain specialty systems will be functionally tested by the installing contractor or vendor. These are noted with an asterisk (*) above. The CxA will review the functional tests for these systems (provided by others).
- B. Contractor is responsible for execution of required Functional Performance Tests, after completion of Prefunctional Checklist and before closeout.
- C. Commissioning Authority is responsible for witnessing and reporting results of Functional Tests, including preparation and completion of forms for that purpose.
- D. Contractor is responsible for correction of deficiencies and re-testing at no extra cost to Owner; if a deficiency is not corrected and re-tested immediately, the Commissioning Authority will document the deficiency and the Contractor's stated intentions regarding correction.
1. The Contractor shall provide the CxA with a "Readiness for functional testing" statement for all systems and equipment to be tested. This shall be provided a minimum of 2 weeks prior to functional testing witnessed by the CxA.

2. The responsible Contractor or sub-contractor shall perform a complete “dry run” functional test on all systems and equipment prior to notifying the CxA that the system is ready for final functional testing. This shall include filling out the FPT forms provided by the CxA. This is intended to avoid incomplete testing and possible back charge of the Contractor by the CxA.
3. Deficiencies are any condition in the installation or function of a component, piece of equipment or system that is not in compliance with the Contract Documents or does not perform properly.
4. When the deficiency has been corrected, the Contractor completes the form certifying that the item is ready to be re-tested and returns the form to the Commissioning Authority; the Commissioning Authority will reschedule the test and the Contractor shall re-test.
5. Identical or Near-Identical Items: If 10 percent, or three, whichever is greater, of identical or near-identical items fail to perform due to material or manufacturing defect, all items will be considered defective; provide a proposal for correction within 2 weeks after notification of defect, including provision for testing sample installations prior to replacement of all items.
6. Contractor shall bear the cost of Owner and Commissioning Authority personnel time witnessing re-testing if the test failed due to lack of readiness to test as described above. This shall include:
 - a. Failure to execute the relevant Prefunctional Checklist correctly and completely.
 - b. Failure to perform all testing and balancing (TAB) procedures per specifications, prior to notification of readiness for testing.
 - c. Incomplete or inaccurate point-to-point controls systems checkout.
 - d. Incomplete or inaccurate controls sensor calibration.
 - e. Incomplete “dry run” tests as noted above.

E. Functional Test Procedures:

1. Some test procedures may be included in the Contract Documents; where Functional Test procedures are not included in the Contract Documents, test procedures will be determined by the Commissioning Authority with input by and coordination with Contractor.
2. Examples of Functional Testing:
 - a. Test the dynamic function and operation of equipment and systems (rather than just components) using manual (direct observation) or monitoring methods under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint).
 - b. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc.
 - c. Systems are run through all the HVAC control system’s sequences of operation and components are verified to be responding as the sequence's state.
 - d. Traditional air or water test and balancing (TAB) is not Functional Testing; spot checking of TAB by demonstration to the Commissioning Authority is Functional Testing.

3.5 SENSOR AND ACTUATOR CALIBRATION

- A. Calibrate all field-installed temperature, relative humidity, carbon dioxide, pressure sensors and gages, and all actuators (dampers and valves) on each piece of equipment to be tested. Sensors installed in the unit at the factory with calibration certification provided need not be field calibrated.
- B. Calibrate using the methods described below; alternate methods may be used, if approved by Owner beforehand. See PART 2 above for test instrument requirements. Record methods used on the relevant Prefunctional Checklist or other suitable forms, documenting initial, intermediate and final results.
- C. All Sensors:
 - 1. Verify that sensor location is appropriate and away from potential causes of erratic operation.
 - 2. Verify that sensors with shielded cable are grounded only at one end.
 - 3. For sensor pairs that are used to determine a temperature or pressure difference, for temperature make sure they are reading within 0.2-degree F of each other, and for pressure, within tolerance equal to 2 percent of the reading, of each other.
 - 4. Tolerances for critical applications may be tighter.
- D. Sensors Without Transmitters - Standard Application:
 - 1. Make a reading with a calibrated test instrument within 6 inches of the site sensor.
 - 2. Verify that the sensor reading, via the permanent thermostat, gauge or building automation system, is within the tolerances in the table below of the instrument-measured value.
 - 3. If not, install offset, calibrate or replace sensor.
- E. Sensors with Transmitters - Standard Application.
 - 1. Disconnect sensor.
 - 2. Connect a signal generator in place of sensor.
 - 3. Connect ammeter in series between transmitter and building automation system control panel.
 - 4. Using manufacturer's resistance-temperature data, simulate minimum desired temperature.
 - 5. Adjust transmitter potentiometer zero until 4 mA is read by the ammeter.
 - 6. Repeat for the maximum temperature matching 20 mA to the potentiometer span or maximum and verify at the building automation system.
 - 7. Record all values and recalibrate controller as necessary to conform with specified control ramps, reset schedules, proportional relationship, reset relationship and P/I reaction.
 - 8. Reconnect sensor.
 - 9. Make a reading with a calibrated test instrument within 6 inches of the site sensor.
 - 10. Verify that the sensor reading, via the permanent thermostat, gauge or building automation system, is within the tolerances in the table below of the instrument-measured value.
 - 11. If not, replace sensor and repeat.
 - 12. For pressure sensors, perform a similar process with a suitable signal generator.

F. Sensor Tolerances for Standard Applications: Plus/minus the following maximums:

1. Watthour, Voltage, Amperage: 1 percent of design.
2. Pressure, Air, Water, Gas: 3 percent of design.
3. Air Temperatures (Outside Air, Space Air, Duct Air): 0.4 degrees F.
4. Relative Humidity: 4 percent of design.
5. Barometric Pressure: 0.1 inch of Hg.
6. Flow Rate, Air: 10 percent of design.
7. Flow Rate, Water: 4 percent of design.
8. CO2 levels: 4 percent of design.

G. Valve/Damper Stroke Setup and Check:

1. For all valve/damper actuator positions checked, verify the actual position against the control system readout.
2. Set pump/fan to normal operating mode.
3. Command valve/damper closed; visually verify that valve/damper is closed and adjust output zero signal as required.
4. Command valve/damper to open; verify position is full open and adjust output signal as required.
5. Command valve/damper to a few intermediate positions.
6. If actual valve/damper position does not reasonably correspond, replace actuator or add pilot positioner (for pneumatics).

H. Isolation Valve or System Valve Leak Check: For valves not associated with coils:

1. With full pressure in the system, command valve closed.
2. Use an ultra-sonic flow meter to detect flow or leakage.

3.6 TEST PROCEDURES - GENERAL

- A. Provide skilled technicians to execute starting of equipment and to execute the Functional Tests. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem-solving. The CxA will list required participants for each
- B. Provide all necessary materials and system modifications required to produce the flows, pressures, temperatures, and conditions necessary to execute the test according to the specified conditions. At completion of the test, return all affected equipment and systems to its pre-test condition.
- C. Sampling: Where Functional Testing of fewer than the total number of multiple identical or near-identical items is explicitly permitted, perform sampling as follows:
1. Identical Units: Defined as units with same application and sequence of operation; only minor size or capacity difference.
 2. Sampling is not allowed for:
 - a. Major equipment.
 - b. Life-safety-critical equipment.
 - c. Prefunctional Checklist execution.

3. XX = the percent of the group of identical equipment to be included in each sample; defined for specific type of equipment.
 4. YY = the percent of the sample that if failed will require another sample to be tested; defined for specific type of equipment.
 5. Randomly test at least XX percent of each group of identical equipment, but not less than three units. This constitutes the "first sample."
 6. If YY percent of the units in the first sample fail, test another XX percent of the remaining identical units.
 7. If YY percent of the units in the second sample fail, test all remaining identical units.
 8. If frequent failures occur, resulting in more troubleshooting than testing, the Commissioning Authority may stop the testing and require Contractor to perform and document a checkout of the remaining units prior to continuing testing.
- D. Manual Testing: Use hand-held instruments, immediate control system readouts, or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the "observation").
- E. Simulating Conditions: Artificially create the necessary condition for the purpose of testing the response of a system; for example: utilize ice baths to simulate freeze conditions on freeze stats.
- F. Simulating Signals: Disconnect the sensor and use a signal generator to send an amperage, resistance or pressure to the transducer and control system to simulate the sensor value.
- G. Over-Writing Values: Utilize virtual signal commands to change the sensor value known to the control system to see the response of the system; for example, change the outside air temperature value from 50 degrees F to 75 degrees F to verify economizer operation.
- H. Indirect Indicators: Remote indicators of a response or condition, such as a reading from a control system screen reporting a damper to be 100 percent closed, are considered indirect indicators.
- I. Monitoring: Record parameters (flow, current, status, pressure, etc.) of equipment operation using the trending capabilities of the relevant control systems; where monitoring of specific points is called for in Functional Test Procedures:
1. All points that are monitored by the relevant control system shall be trended by Contractor. Trended points for specific functional tests shall be identified by the Commissioning Authority.
 2. Other points will be monitored by the Commissioning Authority using dataloggers or by manual measurement.
 3. Provide electronic copies of all monitored data in columnar format with time down left column and at least 5 columns of point values on same page. Graphical output is also required for all trend log information. Deliver to CxA within two days of completed functional tests.
- 3.7 OPERATION AND MAINTENANCE MANUALS
- A. See Section 01 7800 "Closeout Submittals" for additional requirements.
- B. Add design intent documentation furnished by Architect to manuals prior to submission to Owner.

- C. Submit manuals related to items that were commissioned to Commissioning Authority for review; make changes recommended by Commissioning Authority.

3.8 TRAINING OF OWNER PERSONNEL

- A. The GC shall be responsible for training coordination and scheduling and ultimately for ensuring that training is completed.
- B. The CxA will be responsible for overseeing and approving the content and adequacy of the training of Owner personnel for commissioned equipment, as called for in the contract documents.
 - 1. The contractor shall provide training for commissioned systems and equipment that covers the following topics:
 - a. General purpose of the system (design intent)
 - b. Use of the O&M manuals
 - c. Review of control drawings and schematics
 - d. Startup, normal operation, shutdown, unoccupied operation, seasonal changeover, manual operation, controls set-up and programming, troubleshooting, and alarms.
 - e. Interactions with other systems
 - f. Adjustments and optimizing methods for energy conservation
 - g. Relevant health and safety issues
 - h. Special maintenance and replacement sources
 - i. Tenant interaction issues
 - j. Discussion of environmentally responsive features of the system
 - 2. In addition to these general requirements, specific training requirements (duration, topics, etc.) of Owner personnel by Subs and vendors is specified in various equipment sections in Divisions 22, 23, 26, 27 and 28.
 - 3. Each Sub and vendor responsible for training will submit a written training plan to the CxA for review and approval prior to training. The plan will cover the following elements:
 - a. Equipment (included in training)
 - b. Intended audience
 - c. Location of training
 - d. Objectives
 - e. Methods (classroom lecture, video, site walk-through, actual operational demonstrations, written handouts, etc.)
 - f. Subjects covered (description, duration of discussion, special methods, etc.)
 - g. Duration of training on each subject
 - h. Instructor for each subject

3.9 DEFERRED TESTING

- A. Unforeseen Deferred Tests: If any check or test cannot be completed due to the building structure, required occupancy condition or other deficiency, execution of checklists and functional testing may be delayed upon approval of the PM. These tests will be conducted as soon as possible. Services of necessary parties will be negotiated.

- B. Anticipated Deferred Functional Tests: Some tests may need to be performed later, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design or other site conditions. Participation in these tests remains the Contractor's responsibility and will be performed during the normal building occupancy period.

3.10 FINAL COMMISSINING REPORT

- A. The commissioning process generates written work products described in various parts of the Specifications. The Commissioning Plan lists the formal written work products, describes briefly their contents, who is responsible to create them, their due dates, who receives and approves them, and the location of specifications to create them.
- B. The final commissioning report will include an executive summary, list of participants and roles, brief building description, overview of commissioning and testing scope and a general description of testing and verification methods.
- C. For each piece of commissioned equipment, the report should contain the disposition of the commissioning authority regarding the adequacy of the equipment, documentation and training meeting the contract documents in the following areas:
 - 1. Equipment meeting the equipment specifications.
 - 2. Equipment installation.
 - 3. Functional performance and efficiency.
 - 4. Equipment documentation and design intent.
 - 5. Operator training.
- D. Outstanding non-compliance items will be specifically listed. Recommendations for improvement to equipment or operations, future actions, commissioning process changes, etc. will also be listed. Each non-compliance issue will be referenced to the specific functional test, inspection, trend log, etc. where the deficiency is documented. The functional performance and efficiency section for each piece of equipment will include a brief description of the verification method used (manual testing, BAS trend logs, data loggers, etc.) and include observations and conclusions from the testing.

END OF SECTION 01 9113

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SECTION 02 4119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of selected portions of building or structure including below-grade construction.
 - 2. Removal and capping utilities.
 - 3. Removal and salvage of existing items to be reused or recycled, as scheduled at the end of this Section and as indicated on Drawings.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Carefully detach 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, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.

1.5 INFORMATIONAL SUBMITTALS

- A. Predemolition Photographs or Video: Submit before Work begins. Provide where requested by Owner during predemolition conference.

1.6 CLOSEOUT SUBMITTALS

- A. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.7 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: Removed by Owner prior to start of Work.
 - 1. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents. Notify Owner immediately upon discovery of hazardous materials.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

1.8 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

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

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

- C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- D. Engage a professional engineer to perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
- E. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
 - 1. Comply with requirements for existing services/systems interruptions specified in Section 01 1000 "Summary."
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Arrange to shut off indicated utilities with utility companies.
 - 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.
 - a. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - b. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - c. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

3.3 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Comply with requirements for access and protection specified in Section 01 5000 "Temporary Facilities and Controls."
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

- C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. 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, to minimize disturbance of adjacent surfaces. 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. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
 - 4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - 5. Dispose of demolished items and materials promptly. Comply with requirements in Section 01 7419 "Construction Waste Management and Disposal."
- B. Removed and Salvaged Items: As indicated on Drawings.
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to Owner or storage area determined during predemolition conference.
 - 4. Protect items from damage during transport and storage.
- C. Removed and Reinstalled Items:
 - 1. Clean and repair items to functional condition adequate for intended reuse.
 - 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 - 3. Protect items from damage during transport and storage.
 - 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
 - 4. Comply with requirements specified in Section 01 7419 "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.6 CLEANING

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

3.7 SELECTIVE DEMOLITION SCHEDULE

- A. Remove: As indicated on Drawings.
- B. Remove and Salvage:
 - 1. Temporary vehicle storage canopies.
 - 2. Existing cabinets from Room F 23, just the cabinets, not the countertops.
 - 3. Door hardware from removed doors, including door lever handles and cylinders; all cataloged with previous location and keying function description. Do not salvage removed doors, door hinges, closers, door stops, or other trim.
 - 4. Electrical breakers, buss bars, panel doors; all cataloged with previous location and description of item.
 - 5. Other items as indicated on Drawings.
- C. Remove and Reinstall: As indicated on Drawings.
- D. Existing to Remain: As indicated on Drawings.
- E. Dismantle: As indicated on Drawings.

END OF SECTION 02 4119

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SECTION 05 5000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Miscellaneous steel framing and supports.
2. Slotted channel framing (Unistrut).
3. Shelf angles and loose lintels.
4. Metal ladders.
5. Metal ships' ladders.
6. Elevator pit sump covers.
7. Miscellaneous steel trim.
8. Metal Bollards.
9. Abrasive stair nosings.
10. Loose bearing and leveling plates.
11. Metal pegboard.
12. Ear protection storage bar.
13. Welding booth.
14. Sheet metal panel (MP-3).
15. Stainless steel wall guard.
16. Retractable ladder.
17. Other steel items not considered structural steel.

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

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

1.2 COORDINATION

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

1.3 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Paint products.
 - 2. Grout.
 - 3. Abrasive stair nosing.
- B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
- C. Delegated-Design Submittal: For items indicated, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

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

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
 - 3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.6 FIELD CONDITIONS

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer to design ladders and Unistrut assemblies.

- B. Structural Performance of Ladders: Ladders, including landings, shall withstand the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
 - 1. CNC Bar Components: 14 gauge hot-rolled steel. Confirm dimensions and locations on Drawings.
 - 2. Display Cabinet Surround: 3 gauge (1/4-inch) hot rolled steel. Confirm dimensions and locations on Drawings.
 - 3. Welding Booth Frame: 12 gauge hot rolled steel. Confirm dimension and location on Drawings.
- C. Stainless-Steel Bars and Shapes: ASTM A276, Type 304.
- D. Rolled-Steel Floor Plate: ASTM A786/A786M, rolled from plate complying with ASTM A36/A36M or ASTM A283/A283M, Grade C or D.
- E. Steel Tubing: ASTM A500/A500M, cold-formed steel tubing.
- F. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.
- G. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
 - 1. Size of Channels: 1-5/8 by 1-5/8 inches.
 - 2. Material: Galvanized steel, ASTM A653/A653M, commercial steel, Type B, with G90 coating; 0.108-inch nominal thickness.

2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941 (ASTM F1941M), Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
- B. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F2329.

- C. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
 - 1. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F593 (ASTM F738M), and nuts, ASTM F594 (ASTM F836M).
- D. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches by length indicated with anchor straps or studs not less than 3 inches long at not more than 8 inches on center. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.
- E. Miscellaneous Fasteners:
 - 1. Display Cabinet: No. 10 by 1-inch, black pan head Phillips sheet metal screws.
 - 2. No. 10 by 1-inch, self-tapping sheet metal screws, flat head.
 - 3. No. 12 by 1-1/4 inches, black flat head Phillips drive wood screw.

2.4 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Section 09 9100 "Painting," and Section 09 9600 "High-Performance Coatings" finish coats.
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 - 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- C. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
- D. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- F. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- G. Concrete: Comply with requirements in Section 03 3000 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi.

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Use connections that maintain structural value of joined pieces.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges. Remove sharp or rough areas on exposed surfaces.
- C. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended.
- D. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Locate joints where least conspicuous.
- E. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- F. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors not less than 8 inches from ends and corners of units and 24 inches on center.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

2.7 SHELF ANGLES AND LOOSE STEEL LINTELS

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

2.8 METAL LADDERS

- A. General:
1. Comply with ANSI A14.3, except for elevator pit ladders.
 2. For elevator pit ladders, comply with ASME A17.1/CSA B44.
- B. Steel Ladders:
1. Space siderails 18 inches apart unless otherwise indicated.
 2. Siderails: Continuous, 3/8-by-2-1/2-inch steel flat bars, with eased edges.
 3. Rungs: 3/4-inch-diameter steel bars.
 4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
 5. Provide nonslip surfaces on top of each rung.

6. Galvanize exterior and elevator ladders, including brackets and prime.
7. Prime interior ladders, including brackets and fasteners, with zinc-rich primer.

2.9 METAL SHIPS' LADDERS

A. Metal Ships' Ladder, Approved Products:

1. Model no. H70, 70 deg. Ships Ladder by Alaco Ladder, Inc.; www.alacoladder.com.
2. Model no. 523, 75 deg. Ship Ladder with Access to Roof Hatch by O'Keeffe's, Inc.; www.okeeffes.com.
3. Model SL-01, Aluminum Ships Stair to Roof Hatch by Precision Ladders, LLC; www.precisionladders.com.

B. Metal Ships' Ladder with Railing Extension, Approved Products:

1. Model no. M75, 75 deg. Ships Ladder by Alaco Ladder, Inc.
2. Model no. 520, 75 deg. Aluminum Ship Ladder by O'Keeffe's, Inc.
3. Model SL-02, Aluminum Ships Stair with Walk-Thru by Precision Ladders, LLC.
4. Model no. U-501, Fixed, Inclined, Aluminum, Standard Ship Ladder with Handrail by UPNOVR, Inc.; www.upnovr.com.

C. Provide metal ships' ladders where indicated. Fabricate of open-type construction with channel or plate stringers and pipe and tube railings unless otherwise indicated. Provide brackets and fittings for installation.

1. Treads shall be not less than 5 inches exclusive of nosing or less than 8-1/2 inches including the nosing, and riser height shall be not more than 9-1/2 inches.
2. Fabricate ships' ladders, including railings from steel.
3. Fabricate treads and platforms from welded or pressure-locked steel bar grating. Limit openings in gratings to no more than 3/4 inch in least dimension.
4. Fabricate treads and platforms from rolled-steel floor or abrasive-surface floor plate.
5. Comply with applicable railing requirements in Section 05 5213 "Pipe and Tube Railings."

D. Galvanize and prime exterior steel ships' ladders, including treads, railings, brackets, and fasteners.

E. Prime exterior steel ships' ladders, including treads, railings, brackets, and fasteners, with zinc-rich primer.

2.10 ELEVATOR PIT SUMP COVERS

A. Fabricate from 3/16-inch abrasive-surface floor plate with four 1-inch-diameter holes for water drainage and for lifting.

B. Fabricate from welded or pressure-locked steel bar grating. Limit openings in gratings to no more than 3/4 inch in least dimension.

C. Provide steel angle supports unless otherwise indicated.

2.11 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
- C. Galvanize exterior miscellaneous steel trim.
- D. Prime interior miscellaneous steel trim with zinc-rich primer.

2.12 METAL PANEL, MP-3

- A. Material: 14 gauge, hot rolled steel sheet; formed as indicated on Drawings.
- B. Finish: Dyed and coated with Penetrol as specified in Section 09 9100 "Painting."
- C. Fasteners: #12 black, flat head Philips drive wood screws at 16 inches o.c.

2.13 METAL PEGBOARD, MP-4 and MP-5

- A. Basis-of-Design Product: PegBoard MX by Diamond Life; www.diamondlifegear.com.
- B. Description: aluminum pegboard, with perimeter back flanges, and perforated to fit standard pegboard hooks of following types:
 - 1. MP-4: Six (6) 4-foot by 4-foot Panels: 45.5 inches by 45.5 inches; 3/4-ton capacity; color, yellow.
 - 2. MP-5: Five (5) 2-foot by 6-foot Panels: 21.5 inches by 69.5 inches; 1/2-ton load capacity; color, matte black.
- C. Pegboard Accessories:
 - 1. Mounting spacers and fasteners, appropriate for substrate being mounted to.
 - a. Baking Board: No. HPBBB; comes preinstalled on back of PegBoard; helps hooks hang straight and hooks with locking tabs to fit snug and not wobble.
 - b. Expanding hollow wall anchor, HWA; for mounting to gypsum board.
 - c. Screws, SCR, No. 14, 2-1/2 inches long, zinc plated, Phillips pan head screw; for fastening to studs.
 - d. Self-Stick Spacers, No. HPBSSS.SM, in quantities required for size of panels.
 - 2. Faceout Rectangular Tube with Tiger Claw MX: No. HD23-102, 12-inch long faceout with Tiger Claw MX adapter, that allows faceout to fit pegboard; finish, chrome.
 - a. Quantity: 60 each.

3. Wood Shelf Planks:

- a. Material: Melamine veneer on MDF; finish, Maple.
- b. Sizes:
 - 1) No. HD85.024: 24 inches wide by 12 inches deep.
 - 2) No. HD85.036: 36 inches wide by 12 inches deep.
 - 3) No. HD85.048: 48 inches wide by 12 inches deep.

2.14 METAL BOLLARDS

- A. Fabricate metal bollards from Schedule 40 steel pipe.
 - 1. Cap bollards with 1/4-inch-thick, steel plate with domed top.
- B. Fabricate bollards with 3/8-inch-thick, steel baseplates for bolting to existing concrete slab. Drill baseplates at all four corners for 3/4-inch anchor bolts.
 - 1. Where bollards are to be anchored to sloping concrete slabs, angle baseplates for plumb alignment of bollards.
- C. Fabricate sleeves for bollard anchorage from steel pipe with 1/4-inch-thick, steel plate welded to bottom of sleeve. Make sleeves not less than 8 inches deep and 3/4 inch larger than outside diameter of bollard.
- D. Fabricate internal sleeves for removable bollards from Schedule 80 steel pipe or 1/4-inch wall-thickness steel tubing with an outside diameter approximately 1/16 inch less than inside diameter of bollards. Match drill sleeve and bollard for 3/4-inch steel machine bolt.
- E. Prime steel bollards with primer specified in Section 09 9600 "High-Performance Coatings."

2.15 ABRASIVE STAIR NOSINGS

- A. Single-component abrasive stair nosing assemblies consisting of an extruded aluminum base container with integral anchoring lugs or studs, and an abrasive filler. Fabricate units in lengths necessary to accurately fit openings or conditions.
- B. Basis-of-Design Product: T-213 Abrasive Stair Nosing by Balco; www.balcousa.com.
- C. Items must conform to the following:
 - 1. Width: 2-inch.
 - 2. Nominal Length: Match stair tread width, less 1/8-inch clearance.
 - 3. Minimum Thickness: At least 1/4-inch thick
 - 4. Color: As selected by the Architect.
- D. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with manufacturer.
- E. Apply clear lacquer to concealed surfaces of metal units set into concrete.

- F. Confirm locations in shop drawings prior to installation.

2.16 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

2.17 STEEL WELD PLATES AND ANGLES

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

2.18 EAR PROTECTION STORAGE BAR

- A. Fabricate storage bar from hot rolled steel flat bar that is 1-inch wide and 0.25-inch thick.
- B. Items must conform to the following:
 - 1. Length: 32 inches.
 - 2. Depth: 5 inches.
 - 3. Leg: 2-inch (with shop drilled hole on center for toggle bolt)
 - 4. Minimum Thickness: 0.25 inch.
- C. Fastener: Provide two black toggle bolt with each bar.
- D. Finish: Dye and Penetrol (See: Metal Panel MP-3 - Penetrol coating on Steel.pdf).
- E. Confirm dimension and locations in shop drawings prior to installation. Provide Sample for finish.



- F.



G.

2.19 WELDING BOOTH

- A. Fabricate welding booth from assemblies consisting of 12 ga metal panels, 2-inch by 0.128-inch thick square tubes and base flange as indicated in Drawings. Weld members together to form a single unit.
- B. Items Must Conform to the Following:
 - 1. Dimension: As shown on Drawings.
 - 2. Color/Finish: Dye and Penetrol (See: Metal Panel MP-3 - Penetrol coating on Steel.pdf).
 - 3. Provide anchors for embedding units in concrete and CMU block.
 - 4. Weld hooks on face of panel as located on Drawings.
- C. Extent of Work: Weld Room. Confirm locations in shop drawings prior to installation.
- D. Welding Safety Curtains:
 - 1. 5 feet, 0 inches wide by 6 feet, 0 inches tall.
 - 2. Curtain material: Transparent vinyl sheet.
 - 3. Curtain thickness: 14 mils.
 - 4. Color: Yellow flame-retardant material.
 - 5. Pre-grommeted with rolling curtain track, track end wall support brackets, steel rollers.
 - 6. Basis-of-Design Product: J. Tillman, 601; yellow.

2.20 STAINLESS STEEL WALL GUARD (SS)

- A. Fabricate stainless steel wall guard from 16-gauge sheet, satin texture.
- B. Dimensions: Refer to interior elevation Drawings.
- C. Fasteners:
 - 1. No. 10 by 1-1/2-inch stainless steel Phillips flat head wood screws.
 - 2. AF-8 plastic anchor.

- D. Adhesive: Fastbond 30 (coverage: 340 sq ft/ gal) (5 gal – 90M016001, 1 gal-90M014001, 1 qrt-90M015001).

2.21 RETRACTABLE LADDER

- A. Basis-of-Design Product: Super Simplex Disappearing Stairway by Precision Ladders, LLC; www.PrecisionLadders.com, or approved substitution.
- B. Standard Box Frame: Fabricated from 1/8-inch thick steel, in depth as required to match ceiling/floor construction. Rough opening size: 30 inches by 64 inches.
- C. Ladder: Spring operated, folding aluminum ladder with serrated aluminum treads and aluminum closure door. Furnish with separate pole to pull down ladder closure door.
- D. Floor to floor height and floor to ceiling height as indicated on Drawings.

2.22 FINISHES, GENERAL

- A. Finish metal fabrications after assembly.

2.23 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.
- B. Shop prime iron and steel items, unless:
 - 1. Items have a galvanized coating.
 - 2. Items are to be embedded in concrete.
 - 3. Items are to be coated with sprayed-on fireproofing.
 - 4. Or, unless otherwise indicated.
- C. Shop prime with rust-inhibitive universal primer, unless zinc-rich primer is indicated.
- D. Preparation for Shop Priming: Prepare surfaces to comply with SSPC-SP6/ 6/NACE No. 3, "Commercial Blast Cleaning."
 - 1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 3. Items Indicated to Receive Primers Specified in Section 09 9600 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 4. Other Items: SSPC-SP 3, "Power Tool Cleaning."
- E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

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

3.2 INSTALLING BEARING AND LEVELING PLATES

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

3.3 INSTALLATION OF METAL BOLLARDS

- A. Fill metal-capped bollards solidly with concrete and allow concrete to cure seven days before installing.
 - 1. Do not fill removable bollards with concrete.
- B. Anchor bollards to existing construction with anchor bolts. Provide four 3/4-inch bolts at each bollard unless otherwise indicated.
 - 1. Embed anchor bolts at least 4 inches in concrete.

- C. Anchor bollards in concrete in formed or core-drilled holes not less than 36 inches deep and 4 inches larger than outside diameter of bollard. Fill annular space around bollard solidly with 3,000 psi concrete at 28 days; mixed and placed to comply with manufacturer's specifications. Slope finish grade up approximately 1/8 inch toward bollard.
- D. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.
- E. Anchor internal sleeves for removable bollards in formed or core-drilled holes not less than 36 inches deep and 3/4 inch larger than outside diameter of sleeve. Fill annular space around internal sleeves solidly with shrinkage-resistant grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch toward internal sleeve.
- F. Anchor internal sleeves for removable bollards in place with concrete footings. Center and align sleeves in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace sleeves in position until concrete has cured.
- G. Place removable bollards over internal sleeves and secure with 3/4-inch machine bolts and nuts. After tightening nuts, drill holes in bolts for inserting padlocks. Owner furnishes padlocks.
- H. Fill bollards solidly with concrete, mounding top surface to shed water.
 - 1. Do not fill removable bollards with concrete.

3.4 RETRACTABLE LADDER INSTALLATION

- A. Install in accord with manufacturer's written instructions.

3.5 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION 05 5000

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SECTION 07 5005 - MEMBRANE ROOFING REPAIR

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes membrane roofing repair and modification.
- B. Work includes roof repair only as required due to construction of work of this Project.
- C. Related Requirements:
 - 1. Section 07 5419 "Polyvinyl-Chloride (PVC) Roofing" for existing roofing membrane.
 - 2. Section 07 6200 "Sheet Metal Flashing and Trim" for coordination with roofing and for flashings used in roofing assemblies.
 - 3. Section 07 9200 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.3 DEFINITIONS

- A. Roofing Terminology: See ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this section.

1.4 PREINSTALLATION MEETINGS

- A. Preliminary Roofing Conference: Before starting repair Work, conduct conference at Project site.
 - 1. Meet with Owner, Architect, and Contractor, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 - 2. Review methods and procedures related to roofing modifications and repair, including, but not limited to, the following:
 - a. Roofing repair preparation, cutting procedures, roofing tie-in and products to be used for repairs, including roofing system manufacturer's written instructions.
 - b. Temporary protection requirements for existing roofing system components that are to remain.
 - c. Construction schedule and availability of materials, Installer's personnel, equipment, and facilities needed to avoid delays.
 - d. Existing roof deck conditions requiring Architect notification.
 - e. Structural loading limitations of roof deck during repair.
 - f. Base flashings, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that affect repair.
 - g. HVAC shutdown and sealing of air intakes, where applicable.

- h. Shutdown of fire-suppression, -protection, and -alarm and -detection systems.
- i. Governing regulations and requirements for insurance and certificates if applicable.
- j. Existing conditions that may require Architect notification before proceeding.

1.5 SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include documentation substantiating materials are compatible and comply with requirements.
- B. Qualification Data: For Installer.
- C. Photographs: Show existing conditions of adjoining construction and surrounding areas requiring modifications, that may be misconstrued as having been damaged by repair operations.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roofing to include in maintenance manuals.
- B. Certified statement from existing roofing manufacturer stating that existing roof warranty has not been affected by Work performed under this Section.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by existing roofing manufacturer to install manufacturer's products complying with warranty requirements of existing roofing.
- B. Contractor shall verify with building Owner type and manufacturer of existing roofing installed.
- C. Comply with hauling and disposal regulations of authorities having jurisdiction for roofing to be disposed of.
- D. Comply with requirements in "Performance Requirements" in Part 2 below.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing manufacturer. Protect stored liquid material from direct sunlight.
 - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.9 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing to be installed according to manufacturer's written instructions and warranty requirements.

1.10 WARRANTY

- A. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of roofing such as roofing membrane, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, roof pavers, and walkway products, for the following warranty period:
 - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty: Contractor to provide modifications to roof systems under manufacturer No Dollar Limit Warranty which complies with manufacturer's requirements to ensure any current warranties are not invalidated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain components for roofing repairs from same manufacturer as installed roofing or manufacturer approved by existing roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.
- B. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly of existing roofing. Identify products with appropriate markings of applicable testing agency. Where indicated, provide fire-resistance-rated roof assemblies identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- C. UL Listing: Provide roofing system and component materials that have been tested for application and slopes indicated and are listed by Underwriters Laboratories, Inc. (UL) for classification indicated.

D. Repair Requirements:

1. Repairs shall not void existing roofing warranties.
2. All products used for repair shall comply with and be approved for use by roofing manufacturer.
3. Confirm acceptable means and methods of removal and repair with roofing manufacturer.
4. All repairs shall comply with manufacturer's written instructions.
5. All flashings shall comply with SMACNA and match existing building standards.
6. No removed roofing materials shall be reused, unless approved by existing roofing manufacturer prior to Work.
7. Provide crickets slope to drain at new curbs. Match existing building standard for cricket materials, including insulation, slope and installation.
8. Protect roofing insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources where exposed during repair procedures.

E. Repair Materials: As specified in Section 07 5419 "PVC Roofing."

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.3 INSTALLATION, GENERAL

- A. Comply with existing roofing manufacturer's written instructions.
- B. Penetrations: Prevent roofing materials used in repair from penetrating and damaging existing roofing assemblies, joints, entering building, or damaging roofing components or adjacent building construction.

3.4 ROOFING REPAIRS, GENERAL

- A. Install roofing according to roofing manufacturer's written instructions and applicable recommendations of ARMA/NRCA's "Repair Manual for Low-slope Membrane Roof Systems."

3.5 PROTECTING AND CLEANING

- A. Protect roofing from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove roofing that does not comply with requirements, repair substrates, and repair or reinstall roofing to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.6 ROOFING INSTALLER'S WARRANTY

- A. WHEREAS _____ of _____, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
 - 1. Owner: _____.
 - 2. Address: _____.
 - 3. Building Name/Type: _____.
 - 4. Address: _____.
 - 5. Area of Work: _____.
 - 6. Acceptance Date: _____.
 - 7. Warranty Period: _____.
 - 8. Expiration Date: _____.
- B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,
- C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.
- D. This Warranty is made subject to the following terms and conditions:
 - 1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
 - a. lightning;
 - b. peak gust wind speed exceeding _____;
 - c. fire;
 - d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
 - e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
 - f. vapor condensation on bottom of roofing; and

- g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

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

1. Authorized Signature: _____.
2. Name: _____.
3. Title: _____.

END OF SECTION 07 5005

SECTION 07 5419 - POLYVINYL-CHLORIDE (PVC) ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Fully adhered, welded seam, single-ply polyvinyl-chloride (PVC) roofing.
 - 2. Work includes only roof repair of existing roofing disturbed, removed or damaged due to construction of work in this Project.
- B. Related Requirements:
 - 1. Section 07 5005 "Membrane Roofing Repair."

1.3 DEFINITIONS

- A. Roofing Terminology: Definitions in ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

1.4 INFORMATIONAL SUBMITTALS

- A. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - 1. Wind uplift compliance shall be confirmed through a submitted, manufacturer approved fastening pattern that is in accord with a rated system listed in the Miami-Dade County "Notice of Approvals" (MDC-NOA) or another accredited independent 3rd party evaluation service.
 - 2. Fire Resistance compliance shall be confirmed through a submitted listing of the precise roofing material matrix, attachment methods and deck type as a "Class-A" rated assembly through the Underwriter's Laboratory Rated Products Directory.
- B. Applicator Certificates: Evidence that applicator selected to apply roofing system has applied that system at least 5 times in the last year or, is certified by the system manufacturer to apply the systems and is eligible to convey manufacturer's system warranty.
- C. Manufacturer's Installation Instructions: Indicate installation requirements, special procedures, and conditions requiring special attention.
- D. Product Test Reports: For components of membrane roofing system, for tests performed by manufacturer and witnessed by a qualified testing agency.
- E. Research/Evaluation Reports: For components of membrane roofing system, from ICC-ES.

- F. Field quality-control reports.
- G. Sample Warranties: Meet or exceed manufacturer's warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roofing system to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Manufacturer shall have 20 years of experience manufacturing roofing materials for this section.
2. Trained Technical Field Representatives, employed by the manufacturer, independent of sales
3. Provide reports in a timely manner of all site visit reports.
4. Provide specified warranty upon satisfactory project completion.

B. Contractor Qualifications:

1. Contractor shall be authorized by the manufacturer with documented experience on at least 5 projects using submitted roofing system to install specified materials prior to the bidding period through satisfactory project completion.
2. Applicators shall have completed projects of similar scope using same materials as specified herein.
3. Contractor shall provide full time, on-site superintendent or foreman experienced with the specified roof system through satisfactory project completion.
4. Applicators shall be skilled in the application methods for all materials.
5. Contractor shall maintain a daily record, on-site, documenting material installation and related project conditions.
6. Contractor shall maintain a copy of all submittal documents, on-site, available at all times for reference.
7. Foreman of field crew: 5 years minimum experience with roofing system.

C. Certifications: Manufacturer's Certification on manufacturer's letterhead.

1. Certify roof system design; penetration, transition, and perimeter details; and system specifications are appropriate and satisfactory for this particular project.
2. Certify products proposed for use comply with referenced standards.
3. Certify material ordered and supplied are compatible with each other, suited for locale and purpose intended and shipped in sufficient quantity to ensure proper timely installation.
4. Certify roofing materials have express warranty of merchantability and fitness for particular purposes of this project.
5. Certify manufacturer has reviewed project and will issue warranty upon successful completion of installation.
6. Certify manufacturer has reviewed project and will issue warranty upon successful completion of installation.
7. Manufacturer's approval of installer.

- D. Independent Inspection: Inspection service shall produce reports documenting each inspection. Reports shall be made available in a timely manner to the Contractor, installer, material manufacturer, and Architect. Inspections should include substrate examination, beginning of installation, periodic intervals, and final inspection prior to any work covering materials on this Section.
- E. Owner reserves right to hire an independent roofing consultant to review submittals, procedures, and installation.
- F. Industry Standards: Conform to NRCA – Roofing and Waterproofing Manual, except where more stringent requirements are indicated.

1.7 FIELD CONDITIONS

A. Safety:

- 1. The contractor shall be responsible for complying with all project-related safety and environmental requirements.
- 2. Heat-weld shall include heating the specified membrane ply using propane roof torches or electric hot-air welding equipment. The contractor shall determine when and where conditions are appropriate to utilize heat-welding equipment. When conditions are determined by the contractor to be unsafe to proceed, equivalent materials and methods shall be utilized to accommodate requirements and condition.
- 3. Refer to NRCA CERTA recommendations, local codes and building owner's requirements for hot work operations.
- 4. The contractor shall review project conditions and determine when and where conditions are appropriate to utilize the specified liquid-applied, or semi-solid roofing materials. When conditions are determined by the contractor to be unsafe or undesirable to proceed, measures shall be taken to prevent or eliminate the unsafe or undesirable exposures and conditions, or equivalent approved materials and methods shall be utilized to accommodate requirements and condition.
- 5. The contractor shall review project conditions and determine when and where conditions are appropriate to utilize the specified hot asphalt-applied materials. When conditions are determined by the contractor to be unsafe or undesirable to proceed, measures shall be taken to prevent or eliminate the unsafe or undesirable exposures and conditions, or equivalent approved materials and methods shall be utilized to accommodate requirements and conditions. .
- 6. The contractor shall refer to product Material Safety Data Sheets (MDS) for health, safety, and environment related hazards, and take all necessary measures and precautions to comply with exposure requirements.
- 7. Comply with all OSHA requirements for construction.
- 8. Daily site cleanup shall be performed to minimize debris and hazardous congestion.

B. Environmental Conditions:

- 1. Monitor substrate temperature and material temperature, as well as all environmental conditions such as ambient temperature, moisture, sun, cloud cover, wind, humidity, and shade. Ensure conditions are satisfactory to begin work and ensure conditions remain satisfactory during the installation of specified materials. Materials and methods shall be adjusted as necessary to accommodate varying project conditions. Materials shall not be installed when conditions are unacceptable to achieve the specified results.

2. Precipitation and dew point: Monitor weather to ensure the project environment is dry before, and will remain dry, during the application of roofing materials. Ensure all roofing materials and substrates remain above the dew point temperature as required to prevent condensation and maintain dry conditions.
3. Cold adhesive application: Primer, where used, shall be fully dry before proceeding. During cold weather, store the specified membrane adhesives, flashing cements and mastics in heated storage areas. Take all necessary measures and monitor application conditions, to ensure the adhesive and cement materials are no less than 70°F (21°C) at the point of contact with the membrane.
4. Heat-Welding Application: Take all necessary precautions and measures to monitor conditions to ensure all environmental conditions are safe to proceed with the use of torches and hot-air welding equipment. Combustibles, flammable liquids and solvent vapors that represent a hazard shall be eliminated and primers shall be fully dry before proceeding with heat-welding operations. Refer to NRCA CERTA recommendations.

C. Protection:

1. Schedule installation sequence to limit access and utilization of the newly installed membrane for material storage, construction staging, mechanical and/or excessive foot traffic.
2. Provide proper protection on all newly completed roofing to avoid damage to the new roofing system.
3. Traffic should be minimized on a freshly laid roof.
4. Protect building walls, rooftop units, windows and other components during installation.

1.8 PROJECT MEETINGS

A. Preliminary Roofing Meeting: Before starting roof deck construction, conduct conference at a location to be determine.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review deck substrate requirements for conditions and finishes, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

B. Pre-Installation Meeting: Conduct meeting at a location to be determined by architect.

1. Purpose of Pre-Installation Meeting: Review styrene-butadiene modified bituminous membrane requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details, installation procedures, testing and inspection procedures, and protection and repairs.
2. Attendees to include:
 - a. Architect
 - b. Building Envelope Consultant
 - c. Contractor
 - d. Applicator
 - e. Manufacturer's Technical Representative
3. Agenda:
 - a. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 - b. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - c. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 - d. Review structural loading limitations of roof deck during and after roofing.
 - e. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
 - f. Review governing regulations and requirements for insurance and certificates if applicable.
 - g. Review temporary protection requirements for roofing system during and after installation.
 - h. Review roof observation and repair procedures after roofing installation.
 - i. Review locations

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Conform to applicable provisions of Division 01 and manufacturer's written recommendations.
- B. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- C. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- D. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

- E. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.
- F. Store flammable materials in well-ventilated, cool, dry place away from sparks and flame. Use before expiration of shelf life. Follow all precautions as outlined in manufacturer's Material Safety Data Sheets.
- G. All rolls of membrane shall be stored, lying down, elevated above the roof deck and completely protected from moisture with tarpaulins. Manufacturer's packaging is not considered adequate for outdoor storage.
- H. Materials, having been determined by the owner/owner's representative to be damaged, shall be immediately removed from the construction site and replaced at no cost to the owner.

1.10 WARRANTIES

- A. Manufacturer's Warranty: Upon installation completion and manufacturer acceptance of the work required by this Section, the manufacturer will provide a written in manufacturer's standard form agreement to the project Owner, No Dollar Limit (NDL), fully transferable to new Owner, non-prorated warranty, covering both materials and labor during specified warranty period.
 - 1. Warranty Period: Twenty (20) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design: Carlisle Syntec; www.carlislesyntec.com.

2.2 PERFORMANCE REQUIREMENTS

- A. Wind Resistance:
 - 1. Performance testing shall be in accordance with ANSI/FM 4474, FM 4450, FM 4470, UL 580 or UL 1897.
 - a. Roof System Design Pressures: As set forth by the most recent edition of ASCE 7 for the Field of the roof (Zone 1) and as indicated by Table 1 of FM 1-29 for the specified roof system attachment requirements at Zones 2 (Perimeter) and 3 (Corner) for the specific geographical area the project is located.
- B. Fire Classification:
 - 1. Performance testing shall be in accordance with UL 790, ASTM E 108, FM 4450 or FM 4470 to meet the 1/4:12 roof slope requirement.
 - a. Meets requirements of UL Class A or FM Class A.
 - 2. Performance testing shall be in accordance with UL 1256, FM 4450 or FM 4470 to meet the specified requirements for interior flame spread and fuel contribution.

- a. Meets requirements of UL 1256, or FM Class 1.

C. Roof Slope:

1. Finished roof slope for surfaces shall be 1/4 inch per foot minimum for roof drainage.

D. Impact Resistance:

1. Performance testing for impact resistance shall be in accordance with FM 4450, FM 4470, ASTM D3746 or CGSB 37-GP 56M to meet the specified impact resistance requirements.

2.3 ROOFING SHEET MATERIALS

A. Reinforced polyvinyl-Chloride (PVC) Sheet: Uniform, flexible sheet formed from a polyvinyl-chloride, internally fabric or scrim reinforced, and as follows:

1. Thickness: 80 mils minimum.
2. Size: Largest possible sheets as determined by project conditions; do not overload structural roof deck.
3. Seams: Hot-air weldable.
4. Membrane remains pliable, weldable, and watertight throughout its useful life, minimum of warranty period.
5. Physical Properties:
 - a. Tear Strength: 45 lbf minimum per ASTM D751 proc. B.
 - b. Ozone Resistance: No crack per ASTM D 1149.
 - c. Puncture Resistance: 320 lbf minimum per FTM 101 C, method 2031.
 - d. Field Seam Strength: 25 lbf/in minimum per ASTM D 1876
 - e. Water Vapor Permeance: Maximum 0.10 perms per ASTM E 96 proc. B.
 - f. Ozone Resistance: No crack per ASTM D 1149
6. Color: White.
7. Products per Envelope Consultant:
 - a. Carlisle Syntec; Sure-flex fully adhered PVC.
 - b. Or, approved substitution.

2.4 AUXILIARY ROOFING MATERIALS

A. Bonding Adhesive for Membrane Roofing:

1. Products per Envelope Consultant:
 - a. Carlisle Syntec; Sure-flex low VOC Bonding Adhesive.

B. Base Flashing Material: Manufacturer's standard system compatible with and matching color of roof membrane.

C. Wood Nailers: Solid, preservative treated softwood.

D. Sheet Seaming System: Manufacturer's standard hot-air welding apparatus.

- E. Walkways: Manufacturer's standard system compatible with and matching color of roof membrane. Locations as indicated on Drawings.
- F. Metal Termination Bars: Manufacturer's standard stainless-steel or aluminum bars, prepunched, with nylon anchors and stainless-steel pins.
- G. Penetration Curb: Precast curb components, pourable sealant, and structural adhesive sealant around penetration on roofing systems.
 - 1. Products per Envelope Consultant:
 - a. Chem Link Brand; ChemCurb System.
 - b. As required by the manufacturer for the purposes of warranty.
- H. Roof Drains: Cast iron roof drain with clamping ring.
 - 1. Products per Envelope Consultant:
 - a. Zurn Engineered Water Solutions; Cast Iron Drain.
 - b. Thunderbird Products; Thunderbird Flanged Drain.
- I. Miscellaneous Accessories: Provide those recommended by roofing system manufacturer.

2.5 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 3 (25 psi), felt or glass-fiber mat facer on both major surfaces.
 - 1. Products per Envelope Consultant: As required by the manufacturer for the purposes of warranty.
 - 2. Thickness: Minimum 6 inches per ASHRAE 90.1.
- C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches unless otherwise indicated.
- D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.6 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with roofing.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

- C. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:
 - 1. Full-spread spray-applied, low-rise, two-component urethane adhesive.
- D. Insulation Cant Strips: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.
- E. Tapered Edge Strips: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.
- F. Cover Board: 1/2-inch thick, high density (HD) polyisocyanurate coverboard.
 - 1. Products per Envelope Consultant:
 - a. Carlise Syntec SecurShield HD Polyiso.
- G. Parapet Sheathing: Pre-primed, glass faced gypsum board.
 - 1. Products per Envelope Consultant:
 - a. Georgia Pacific DensDeck Prime (thickness to match existing parapet sheathing).

PART 3 - EXECUTION

3.1 GENERAL

- A. Material Safety Data Sheets (MSDS) must be on location at all times during transportation, storage, and application of materials. The applicator shall follow all safety regulations as recommended by OSHA and other agencies having jurisdiction.
- B. Subject to project conditions, it is recommended to begin the application of this roofing system at the highest point of the project area and work to the lowest to prevent water infiltration. This will include completion of all flashings, terminations and daily seals.
- C. A proper substrate shall be provided by the building owner. The structure shall be sufficient to withstand normal construction loads and live loads.
- D. The roofing contractor is responsible for coordinating the installation to ensure that the system remains watertight at the end of each working day.

3.2 EXAMINATION

- A. Examination includes visual observations, qualitative analysis, and quantitative testing measures as necessary to ensure conditions remain satisfactory throughout the project.
- B. The contractor shall examine all roofing substrates including, but not limited to insulation materials, roof decks, walls, curbs, rooftop equipment, fixtures, and wood blocking.
- C. The applicator shall not begin installation until conditions have been properly examined and determined to be clean, dry, and otherwise satisfactory to receive specified roofing materials.

- D. During the application of specified materials, the applicator shall continue to examine all project conditions remain satisfactory to complete the specified roofing system.

3.3 PREPARATION

- A. Before commencing work each day, the contractor shall prepare roofing substrates to ensure conditions are satisfactory to proceed with the installation of specified roofing materials. Preparation of substrates includes, but is not limited to substrate repairs, securement of substrates, eliminating all incompatible materials, and cleaning.
- B. Where conditions are found to be unsatisfactory, do not begin work until conditions are made satisfactory to begin work. Commencing of work shall indicate contractor's acceptance of conditions.
- C. Clean substrate of dust, debris, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- D. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- E. Wood Nailers:
 - 1. Install wood nailers, underlayment, membrane, and accessories in accordance with manufacturer's requirements.
 - 2. Install at roof perimeter and at base of penetrations over 18 inches long or in diameter.

3.4 INSULATION SYSTEM INSTALLATION

- A. Follow insulation system component product data sheets, published general requirements and, approvals.
- B. Install insulation system components on clean, dry, uniform and, properly prepared substrates. Refer to Paragraph 3.3-A above.
- C. Carefully install insulation system boards and fit against adjoining sheets to form tight joints. New insulation should have their seams staggered against any subsequent coverboard/insulation application to minimize thermal bridging.
- D. Insulation system boards that must be cut to fit shall be saw-cut or knife-cut in a straight line, not broken. Use chalk lines to cut insulation components. Uneven or broken edges shall not be accepted. Remove dust and debris that develops during cutting operations.
- E. Stagger successive layers of insulation 12 inches vertically and laterally to ensure board joints do not coincide with joints from the layers above and below.
- F. Crickets, saddles, and tapered edge strips shall be installed before installing Cover boards.
- G. Install tapered insulation, saddles and crickets as required to ensure positive slope for complete roof drainage.

- H. Cover-boards shall be installed to fit tight against adjacent boards. When required by the Cover-board manufacturer, a uniform gap shall be provided between Cover-boards using a uniform guide placed between board joints to form a gap between all boards during installation.
- I. The finished insulation system surface shall be tight to, and flush with, adjacent substrates to form a satisfactory substrate to install specified roof membrane and flashings.
- J. Install specified cants where required for membrane flashing transitions

3.5 INSULATION FASTENER INSTALLATION

- A. Fasten to the deck using specified insulation fasteners and plates.
- B. Fasten the insulation to meet the specified wind uplift resistance performance requirements and warranty requirements as indicated in Part I.
- C. For insulation and Cover-boards located partially within the defined perimeter and/or corners, install fastening for the entire board as specified herein.

3.6 SINGLE-PLY MEMBRANE INSTALLATION

- A. Do not apply roofing materials to surfaces which are unacceptable to manufacturer and installer.
- B. Sequence work to avoid traversing over completed areas in order to continue roofing operations.
- C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.
- D. Install night cut-off sealer and appropriate tie offs at end of day's work.
- E. A minimum of one perimeter sheet shall be installed at edges of each roof level.
- F. Membrane that has been exposed to the elements for approximately 7 days must be prepared per roofing manufacturer written recommendation.
- G. Unroll membrane over prepared substrate in approximate final position. Allow to relax.
- H. Cut sheet to maximum length possible to minimize seams.
- I. Overlap sheets at edges and ends per roofing manufacturer written recommendation.
- J. Adhere Sure-Flex membrane to an acceptable substrate with Carlisle Bonding Adhesive. Comply with Labels, Safety Data Sheet (SDS) and Product Data Sheets for installation procedures and use. Adhesive must be applied to both the membrane and the surface to which it is being bonded.
- K. Fold membrane sheet back so half the underside is exposed. Sheet fold should be smooth without wrinkles or buckles.
- L. Stir Bonding Adhesive thoroughly scraping the sides and the bottom of the can (minimum 5 minutes stirring is recommended). Bonding surfaces must be dry and clean.

- M. Apply Bonding Adhesive to the exposed underside of the membrane and the corresponding substrate area. Do not apply Bonding Adhesive along the splice edge of the membrane to be heat welded over adjoining sheet.
 - 1. A coverage rate of approximately 120 square feet per gallon per one surface (membrane or substrate) or approximately 60 square feet per gallon per finished surface (includes coverage on both membrane and substrate) shall be achieved.
 - 2. Apply adhesive evenly, without globs or puddles with a plastic core, medium nap paint roller to achieve continuous coating of both surfaces. A 9-inch roller will easily fit into the 5-gallon containers.
 - 3. A mechanical roller dispenser can be used to apply Bonding Adhesive when the continuous coating and coverage rate noted above are maintained. Back rolling is required.
- N. Allow adhesive to dry until tacky but will not string or stick to a dry finger touch.
- O. Roll the coated membrane into the coated substrate while avoiding wrinkles.
- P. Brush down the bonded section of the membrane sheet immediately after rolling the membrane into the adhesive with a soft bristle push broom to achieve maximum contact.
- Q. Fold back the un-bonded half of the sheet and repeat the bonding procedures. Apply Bonding Adhesive to the remaining exposed underside of membrane and adjacent substrate and complete this section as described above.
- R. Install adjoining membrane sheets in the same manner, overlapping edges a minimum of 2 inches to provide for a minimum 1-1/2 inch heat weld. It is recommended that all splices be shingled to avoid bucking of water.
- S. Hot air weld the membrane sheets a minimum of 1 1/2" with an Automatic Hot Air Welding Machine.
- T. Apply membrane and expansion joint materials to isolate rood into areas as required. Seal roofing membrane sheet to joint flange, apply sealant to edge or seam.
- U. Eliminate fishmouths, wrinkles, bubbles, or other type voids.
- V. Heat weld membrane to adjoining surfaces.
- W. All parapet gypsum sheathing shall be removed and replaced with new gypsum sheathing suitable for subsequent membrane application and as referenced in the Construction Documents.

3.7 SHEET METAL FLASHING INSTALLATION

- A. Refer to sheet metal flashing detail drawings and follow product data sheets and published general requirements for installation instructions.
- B. Follow the most recent edition of the SMACNA Architectural Sheet Metal Manual for fabrication and installation requirements.
- C. Install base flashing, terminations, and fascia trim as indicated and required by manufacturer. Use longest pieces practicable.

- D. Install base flashing up vertical surfaces minimum 8 inches above cant top or edge strip unless otherwise noted. Fasten top of base flashing with devices and at locations and frequency as recommended by manufacturer.
- E. Bond base flashing to substrate in accordance with manufacturer's requirements to obtain water tight bond.
- F. Take measure to ensure base flashing is not ridging where there is change of direction.
- G. Fasten top of base flashing under metal counterflashing at manufacturer's recommended spacing.
- H. Flash penetrations passing through membrane.

3.8 WALKWAYS

- A. At areas outlined on the drawings, and around the perimeter of all rooftop equipment and at all door and stair landings, install walkway protection.
- B. Cut walkway from end of rolls. No piece shall be less than 24 in.
- C. Provide a 2 in space between sheets for drainage.

3.9 FIELD QUALITY CONTROL

- A. Manufacturer's Inspection:
 - 1. Arrange for roofing manufacturer's representative to inspect completed installation and provide written report that installation complies with manufacturer's written instructions.
 - 2. If manufacturer's representative finds installation deficient in any way, remove and replace waterproofing work until manufacturer's representative can certify acceptability of installation.
 - 3. Verify conformance to manufacturer's instructions.
- B. Independent Inspection:
 - 1. Building Envelope Consultant will periodically inspect the installation process of this Section.
 - 2. Contractor to arrange for Independent Inspection to observe completed installation prior to carrying out subsequent work.
- C. If inspection results show products in this Section does not comply with requirements, remove and replace or repair as recommended in writing by manufacturer.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- E. At no additional cost to Owner, remove and replace Work of this section found to be deficient or incomplete.

3.10 PROTECTING AND CLEANING

- A. In areas where adjacent finished surfaces are soiled by work of this Section, consult manufacturer of surfaces for cleaning advice and conform to their recommendations and instructions. Remove all tools, equipment and remaining product on-site. Dispose of section work debris and damaged product following all applicable regulations.
- B. Protect roofing system from damage and wear during remainder of construction period.
- C. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

END OF SECTION 07 5419

SECTION 07 6200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Sheet metal flashing and trim (PFN-#).
 - 2. Manufactured reglets with counterflashing.
 - 3. Formed low-slope roof sheet metal fabrications.
 - 4. Gutters and downspouts.
 - 5. Overhead piping safety pans.

- B. Related Requirements:

- 1. Section 07 4113.13 "Formed Metal Wall Panels" for coordination with trim profiles.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Shop Drawings: For sheet metal flashing and trim.

- 1. Include plans, elevations, sections, and attachment details.
 - 2. Distinguish between shop- and field-assembled work.
 - 3. Include finish at each location and adjacent finish of other work for review and confirmation for each application.
 - 4. Include identification of finish for each item.
 - 5. Include pattern of seams and details of termination points, expansion joints and expansion-joint covers, direction of expansion, roof-penetration flashing, and connections to adjoining work.

- C. Samples: For each exposed product and for each color and texture specified.

1.5 INFORMATIONAL SUBMITTALS

- A. Product certificates.

- B. Product test reports.

- C. Sample warranty.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
 - 1. For copings and roof edge flashings that are SPRI ES-1 tested, shop shall be listed as able to fabricate required details as tested and approved.
- B. Mockups: Build mockups to verify selections made under Sample submittals to demonstrate aesthetic effects and to set quality standards for fabrication and installation.

1.7 WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. SPRI Wind Design Standard: Manufacture and install copings tested according to SPRI ES-1 and capable of resisting the following design pressure:
 - 1. Design Pressure: As indicated on Drawings.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 SHEET METALS

- A. General:

1. Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
 2. Coordinate with Section 074213.13 "Formed Metal Wall Panels" for thicknesses.
 3. Provide metallic-coated sheet steel, 24-gauge trim flashings unless otherwise indicated.
 - a. Contractor's Option: Provide 22-gauge flashing and trim using same coil stock for metal wall and roof panels.
 - b. Provide 22-gauge cleats.
 - c. Provide 26-gauge where stainless steel is indicated on Drawings.
- B. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 (Z275) coating designation; prepainted by coil-coating process to comply with ASTM A 755/A 755M.
1. Exposed Coil-Coated Finish:
 - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 2. Colors: Coordinate finishes between Sections indicated.
 - a. PFN-1: Match MWP-1 in Section 07 4213.13.
 - b. PFN-2: Match MWP-2 in Section 07 4213.13.
 - c. Where embedded in Masonry Veneer: Match masonry finish in Section 04 2613.
- C. Aluminum Sheet: ASTM B209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.
1. Clear Anodic Finish, Coil Coated: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.
 2. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.
- D. Stainless Steel Sheet: ASTM A240/A240M, Type 304, dead soft, fully annealed; with smooth, flat surface.
1. Provide at sill flashings and in masonry veneer unless indicated to be finished.
 2. Finish: ASTM A480, No. 2D finish, except No. 4 where directly exposed to view.
 - a. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
 - b. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 1) Run grain of directional finishes with long dimension of each piece.
 - 2) When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

2.3 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
 - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 - 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
 - 3. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.
- C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
- D. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- F. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

2.4 UNDERLAYMENT

- A. For wall assemblies, see Section 07 2500 "Weather Barriers."

2.5 MANUFACTURED REGLETS

- A. Reglets: Units of type, material, and profile required, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory-mitered and -welded corners and junctions and with interlocking counterflashing on exterior face, of same metal as reglet.
 - 1. 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. Cheney Flashing Company.

- b. Fry Reglet Corporation.
 - c. Hickman Company, W. P.
- 2. Material: Galvanized steel, 0.022 inch (0.56 mm) thick.
 - 3. Finish: Match adjacent flashings, metal roofing or wall panels.

2.6 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
 - 1. Obtain field measurements for accurate fit before shop fabrication.
 - 2. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
 - 3. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
 - 2. Use lapped expansion joints only where indicated on Drawings.
- C. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
- D. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- E. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.
- F. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- G. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use.
- H. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer.

2.7 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Copings: Fabricate in minimum 96-inch-long, but not exceeding 12-foot- long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and interior leg. Miter corners; fasten and seal watertight. Shop fabricate interior and exterior corners.
 - 1. Fabricate from the materials indicated above.
- B. Roof-Penetration Flashing: Fabricate from the following materials:
 - 1. Match roofing.

2.8 ROOF-DRAINAGE SHEET METAL FABRICATIONS

- A. Hanging Gutters:
 - 1. Fabricate to cross section required to match existing gutters, complete with end pieces, outlet tubes, and other accessories as required.
 - 2. Fabricate in minimum 96-inch- (2400-mm-) long sections.
 - 3. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters. Shop fabricate interior and exterior corners.
 - 4. Gutter Profile: As indicated on Drawings, or to match existing adjacent gutters.
 - 5. Accessories: Continuous, removable leaf screen with sheet metal frame and hardware cloth screen.
 - 6. Gutters with Girth up to 15 Inches (380 mm): Fabricate from the following materials:
 - a. Stainless Steel: 16 gauge (0.0625 inch (1.59 mm) thick.
- B. Downspouts: Fabricate round downspouts to dimensions indicated on Drawings, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors. Shop fabricate elbows.
 - 1. Fabricated Hanger Style: Fig. 1-35D in accordance with SMACNA's "Architectural Sheet Metal Manual."
 - 2. Fabricate from stainless steel: 16 gauge (0.0625 inch (1.59 mm) thick.

2.9 WALL SHEET METAL FABRICATIONS

- A. Fabricate in minimum 96-inch-long, but not exceeding 12-foot- long, sections.
- B. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches beyond each side of wall openings; and form with 2-inch- high, end dams.

PART 3 - EXECUTION

3.1 UNDERLAYMENT INSTALLATION

- A. Comply with Sections indicated and manufacturer's written instructions.

- B. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps and edges with roller. Cover underlayment within 14 days.

3.2 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - 1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
 - 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 - 3. Space cleats not more than 12 inches (300 mm) apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
 - 4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
 - 5. Torch cutting of sheet metal flashing and trim is not permitted.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
 - 1. Coat concealed side of uncoated-aluminum sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
 - 2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet (3 m) with no joints within 24 inches (600 mm) of corner or intersection.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.
 - 2. Use lapped expansion joints only where indicated on Drawings.
- D. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction. Prepare joints and apply sealants to comply with requirements in Section 07 9200 "Joint Sealants."

- G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter.
 - 1. Pre-tin edges of sheets with solder to width of 1-1/2 inches; however, reduce pre-tinning where pre-tinned surface would show in completed Work.
 - 2. Do not solder metallic-coated steel and aluminum sheet.
 - 3. Do not use torches for soldering.
 - 4. Heat surfaces to receive solder, and flow solder into joint.
 - a. Fill joint completely.
 - b. Completely remove flux and spatter from exposed surfaces.
 - 5. Stainless Steel Soldering:
 - a. Tin edges of uncoated sheets, using solder for stainless steel and acid flux.
 - b. Promptly remove acid-flux residue from metal after tinning and soldering.
 - c. Comply with solder manufacturer's recommended methods for cleaning and neutralization.
- H. Rivets: Rivet joints in stainless steel where necessary for strength.

3.3 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate.
- C. Copings: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated.
- D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.
- E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints minimum of 4 inches (100 mm).
- F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with butyl sealant and clamp flashing to pipes that penetrate roof.

3.4 ROOF DRAINAGE INSTALLATION

- A. Hanging Gutters:

1. Join sections with riveted and soldered joints.
2. Provide for thermal expansion.
3. Attach gutters at eave or fascia to firmly anchor them in position.
4. Provide end closures and seal watertight with sealant.
5. Slope to downspouts.
6. Fasten gutter spacers to front and back of gutter.
7. Anchor and loosely lock back edge of gutter to continuous eave or apron flashing.
8. Anchor gutter with spikes and ferrules spaced not more than 30 inches (760 mm) apart.
9. Install continuous gutter screens on gutters with noncorrosive fasteners, removable for cleaning gutters.

B. Downspouts:

1. Provide hangers with fasteners designed to hold downspouts securely to walls.
2. Locate hangers at top and bottom and at approximately 60 inches (1500 mm) on center.
3. Provide elbows at base of downspout to direct water away from building.
4. Connect downspouts to underground drainage system.

3.5 WALL FLASHING INSTALLATION

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches (100 mm) beyond wall openings.

3.6 INSTALLATION OF MISCELLANEOUS FLASHING

A. Overhead-Piping Safety Pans:

1. Suspend pans from structure above, independent of other overhead items such as equipment, piping, and conduit, unless otherwise indicated on Drawings.
2. Pipe and install drain line to plumbing waste or drainage system.

3.7 INSTALLATION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.8 CLEANING

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.

3.9 PROTECTION

- A. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended in writing by sheet metal flashing and trim manufacturer.
- C. Maintain sheet metal flashing and trim in clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures, as determined by Architect.

END OF SECTION 07 6200

SECTION 07 8413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Penetrations in fire-resistance-rated walls.
 - 2. Penetrations in horizontal assemblies.
 - 3. Penetrations in smoke barriers.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product Schedule: For each penetration firestopping system. Include location and design designation of qualified testing and inspecting agency.
 - 1. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping condition, submit illustration, with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.4 INFORMATIONAL SUBMITTALS

- A. Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer's written recommendations.
- B. Product test reports.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."
- B. Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:
 - 1. Penetration firestopping tests are performed by UL.
 - 2. Penetration firestopping is identical to those tested per testing standard referenced in "Penetration Firestopping" Article. Provide rated systems bearing marking of qualified testing and inspection agency.

- C. Preinstallation Conference: Conduct conference at Project site.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. A/D Fire Protection Systems Inc.
 2. Grace Construction Products.
 3. Hilti, Inc.
 4. RectorSeal Corporation.
 5. Specified Technologies Inc.
 6. 3M Fire Protection Products.

2.2 PENETRATION FIRESTOPPING

- A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
- B. Penetrations in Fire-Resistance-Rated Walls: Ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Penetrations in Horizontal Assemblies: Ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
1. F-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated.
 2. T-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
- D. Penetrations in Smoke Barriers: Provide penetration firestopping with ratings determined per UL 1479.
1. L-Rating: Not exceeding 5.0 cfm/sq. ft. (0.025 cu. m/s per sq. m) of penetration opening at 0.30-inch wg (74.7 Pa) at both ambient and elevated temperatures.
- E. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- F. VOC Content: Penetration firestopping sealants and sealant primers shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
1. Sealants: 250 g/L.

2. Sealant Primers for Nonporous Substrates: 250 g/L.
 3. Sealant Primers for Porous Substrates: 775 g/L.
- G. Low-Emitting Materials: Penetration firestopping sealants and sealant primers shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- H. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- C. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.
- D. Install fill materials for firestopping by proven techniques to produce the following results:
1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.2 IDENTIFICATION

- A. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."

2. Contractor's name, address, and phone number.
3. Designation of applicable testing and inspecting agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

3.3 PENETRATION FIRESTOPPING SCHEDULE

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.

END OF SECTION 07 8413

SECTION 07 9200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Nonstaining silicone joint sealants.
 - 2. Urethane joint sealants.
 - 3. Mildew-resistant joint sealants.
 - 4. Latex joint sealants.
 - 5. Butyl based sealants.
- B. Related Requirements:
 - 1. Section 07 2500 "Weather Barriers" for sealants in WRB-# assemblies.
 - 2. Section 09 2900 "Gypsum Board" for acoustical joint sealants.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.
- B. Samples: For each kind and color of joint sealant required.
- C. Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.

1.5 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Preconstruction laboratory test reports.
- C. Preconstruction field-adhesion-test reports.
- D. Field-adhesion-test reports.

- E. Sample warranties.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.
- B. Source Limitations: Obtain joint sealant materials from a single manufacturer for each different product required. Where sealants are in contact with one another, they shall be compatible and by the same manufacturer.

1.7 PRECONSTRUCTION TESTING

- A. Preconstruction Laboratory Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
 - 1. Adhesion Testing: Use ASTM C 794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - 2. Compatibility Testing: Use ASTM C 1087 to determine sealant compatibility when in contact with glazing and gasket materials.
 - 3. Stain Testing: Use ASTM C 1248 to determine stain potential of sealant when in contact with masonry substrates.
- B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates. Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

1.8 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

- B. Acoustical Joint-Sealant: Provide products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies according to ASTM E 90.
- C. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- D. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following:
 - 1. Architectural sealants shall have a VOC content of 250 g/L or less.
 - 2. Sealants and sealant primers for nonporous substrates shall have a VOC content of 250 g/L or less.
 - 3. Acoustical sealants and sealant primers shall have a VOC content complying with ASHRAE 189.1.
- E. Low-Emitting Interior Sealants: Sealants and sealant primers shall comply with the testing and product requirements of the California Department of Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- F. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 NONSTAINING SILICONE JOINT SEALANTS

- A. Silicone, Nonstaining, S, NS, 100/50, NT (Type JS-1x): Nonstaining, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
 - 1. Basis-of-Design Products:
 - a. JS-1a: At metal substrates, Exterior: Dowsil 795.
 - b. JS-1b: At Precast, Tilt-Up, Concrete and Masonry, Exterior: Dowsil 790.
 - c. JS-1c: At Interior: Dowsil 758.

2.3 URETHANE JOINT SEALANTS

- A. Urethane, S, NS, 100/50, T, NT (Type JS-2): Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Uses T and NT.
 - 1. Basis-of-Design Products:
 - a. Tremco Dymonic 100.
 - b. Where to be Painted: Masterseal 150 by BASF.

- B. Urethane, M, P, 25, T, NT (JS-3): Multicomponent, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type M, Grade P, Class 25, Uses T and NT.

- 1. Basis-of-Design Product: MasterSeal SL2 by BASF.

2.4 MILDEW-RESISTANT JOINT SEALANTS

- A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.
- B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT (Type JS-4): Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

- 1. Basis-of-Design Product: Dow Corning 786 or GE Sanitary 1700.

- C. Acrylic Latex (Type JS-5): Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

- 1. Basis-of-Design Product: MasterSeal NP 520 by BASF or Tremco Tremflex 834.

2.5 BUTYL JOINT SEALANTS

- A. Butyl-Rubber-Based Joint Sealants (Type JS-6): ASTM C 1311.

2.6 JOINT-SEALANT BACKING

- A. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

2.7 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove laitance and form-release agents from concrete.
 - 2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces.

3.2 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with ASTM C 1193 and joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical joint sealant. Install acoustical joint sealants at both faces of partitions, at perimeters, and through penetrations. Comply with ASTM C 919, ASTM C 1193, and manufacturer's written recommendations for closing off sound-flanking paths around or through assemblies, including sealing partitions to underside of floor slabs above acoustical ceilings.
- C. Acoustical Ceiling Areas: Apply acoustical joint sealant at perimeter edge moldings of acoustical ceiling areas in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
- D. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
- E. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- F. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

- G. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.

- 1. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

3.3 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

- 1. Extent of Testing: Test completed and cured sealant joints as follows:
 - a. Perform 10 tests for the first 1000 feet (300 m) of joint length for each kind of sealant and joint substrate.
 - b. Perform one test for each 1000 feet (300 m) of joint length thereafter or one test per each floor per elevation.
 - 2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

- B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.4 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior joints and penetrations in weather barrier assemblies: See Section 07 2713.

- B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

- 1. Joints between the following materials, Provide Type JS-1x. See Part Two products for each application.
 - a. Metal and metal; JS-1a.
 - b. Metal and concrete; JS-1a.
 - c. Perimeter joints around hollow metal, aluminum, frames between exterior finishes, except wood; JS-1a.
 - d. Joints between existing plant-precast architectural concrete units; JS-1b.
 - e. Construction joints in cast-in-place concrete; JS-1b.
 - f. Control and expansion joints in unit masonry; JS-1b.
 - 2. Joints between the wood and metal, provide sealant compatible with wood finishes, and compatible with silicone sealant, provided by same manufacturer. Provide Type JS-2.
 - a. Color: As selected by Architect for each condition and location.
 - b. Provide bond-breaker or manufacturer's approved separator between joints of different material type.

- C. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.
 - 1. Joint Sealant Type: JS-3.
 - 2. Joint Locations:
 - a. Isolation and contraction joints in cast-in-place concrete slabs.
 - b. Tile control and expansion joints.
 - c. Joints between different materials listed above.
 - d. Other joints as indicated on Drawings.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces and scheduled to be painted.
 - 1. Joint Sealant Type: JS-2.
 - 2. Joint Locations:
 - a. Joints to be painted.
 - b. Other joints as indicated on Drawings.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- E. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.
 - 1. Joint Sealant Type: JS-2.
 - 2. Joint Locations:
 - a. Isolation joints in cast-in-place concrete slabs.
 - b. Control and expansion joints in tile flooring.
 - c. Other joints as indicated on Drawings.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- F. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces
 - 1. Joint Sealant Type: JS-2.
 - 2. Joint Locations:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Tile control and expansion joints.
 - c. Vertical joints on exposed surfaces of unit masonry concrete walls and partitions.
 - d. Other joints as indicated on Drawings.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- G. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.
 - 1. Joint Sealant Type: JS-5.

2. Joint Locations:
 - a. Control joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
 - c. Other joints as indicated on Drawings.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- H. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces
1. Joint Sealant Type: JS-1c.
 2. Joint Locations:
 - a. Joints between precast concrete panels at interior side.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- I. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Sealant Type: JS-4.
 2. Joint Locations:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Tile control and expansion joints where indicated.
 - c. Other joints as indicated on Drawings.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- J. Joint-Sealant Application: Concealed mastic.
1. Joint Sealant Type: JS-6.
 2. Joint Locations:
 - a. Aluminum thresholds.
 - b. Sill plates.
 - c. Other joints as indicated on Drawings.
 3. Joint Sealant: Butyl-rubber based.
 4. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 07 9200

SECTION 08 1113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Standard steel doors.
 - 2. Knock down steel door frames.

- B. Related Requirements:

- 1. Section 08 7100 "Door Hardware" for door hardware placement templates.
 - 2. Section 08 8000 "Glazing" for glass and glazing accessories for door vision panels, where required.
 - 3. Door and Frame Schedule in the Drawings.

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to ANSI/SDI A250.8.

1.4 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.5 SUBMITTALS

- A. Product Data: For each type of product.

- B. Shop Drawings: Include the following:

- 1. Elevations of each door type.
 - 2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
 - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.

- C. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.
- D. Product Test Reports: For each type of fire-rated hollow-metal door and frame assembly, fire-rated borrowed-lite assembly and thermally rated door assemblies for tests performed by a qualified testing agency indicating compliance with performance requirements.
- E. Oversize Construction Certification: For assemblies required to be fire-rated and exceeding limitations of labeled assemblies.
- F. Field quality control reports.

1.6 CLOSEOUT SUBMITTALS

- A. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
 - 1. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated on Drawings, based on testing at positive pressure according to NFPA 252 or UL 10C.
 - 1. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
 - 2. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
- B. Fire-Rated, Borrowed-Lite Assemblies: Assemblies complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

- C. Thermally Rated Door Assemblies: Provide door assemblies with U-factor of not more than 0.46 deg Btu/F x h x sq. ft. when tested according to ASTM C518.
- D. Sound Rating: Provide sound control door assemblies identical to those of assemblies tested as sound-retardant units by an acoustical testing agency, and have the following minimum rating:
 - 1. STC Rating: Minimum 52, or as indicated in the Door Schedule; as calculated by ASTM E413 when tested in an operable condition according to ASTM E90 when installed with acoustical hardware specified.

2.2 MANUFACTURERS

- A. Source Limitations: Obtain steel doors and frames from single source from single manufacturer for each type indicated.
- B. Steel Door Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Ceco Door; ASSA ABLOY.
 - 2. Curries Company; ASSA ABLOY.
 - 3. Deansteel Manufacturing Company, Inc.
 - 4. Steelcraft; an Allegion brand.
 - 5. Stiles Custom Metal, Inc.
 - 6. Or, approved substitution.
- C. Knock-Down Steel Door Frame Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Timely Industries, a Div. of SDS Industries, Inc.; www.timelyframes.com.
 - 2. Or, approved substitution.

2.3 INTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Extra-Heavy-Duty Doors: SDI A250.8, Level 3; SDI A250.4, Level A. At locations indicated in the Door and Frame Schedule.
 - 1. Doors:
 - a. Type: As indicated in Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches.
 - c. Face: Uncoated steel sheet, minimum thickness of 18-gauge (0.053 inch).
 - d. Edge Construction: Model 2, Seamless.
 - e. Core: Vertical steel stiffeners.
 - f. Fire-Rated Core: Manufacturer's standard vertical steel stiffener and laminated mineral board core for fire-rated and temperature-rise-rated doors.

2. Frames:

- a. Materials: Hot dipped galvanized steel sheet, minimum thickness of 18-gauge (0.053 inch).
- b. Construction: Knocked down; field assembled.
- c. Casing: Aluminum casing installed on heat-treated steel clips on frame face after frame is anchored to wall. Finish: primed for field painting.
- d. Hinge Reinforcing: TA-11, 14 gage steel. Hinge plated mechanically attached to hinge emboss on frame.
- e. Frame Reinforcing: TA-10 for regular arm closers or TA-12 for parallel arm closers.
- f. Basis-of-Design Product:
 - 1) Classic "C"-Series frames by Timely Frames.
 - 2) Or, approved substitution.

2.4 EXTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
 - 1. At all exterior locations where installed with framed openings, provide flange return, 1-inch minimum beyond frame face, out-turned, for interface with weather barrier sealing.
- B. Maximum-Duty Doors and Frames: SDI A250.8, Level 4; SDI A250.4, Level A. At locations indicated in the Door and Frame Schedule.
 - 1. Doors:
 - a. Type: As indicated on Drawings.
 - b. Thickness: 1-3/4 inches.
 - c. Face: Metallic-coated steel sheet, minimum thickness of 16-gauge (0.067 inch), with minimum A60 (ZF180) coating.
 - d. Edge Construction: Model 2, Seamless.
 - e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
 - f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
 - g. Bottom Edges: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
 - h. Core: Vertical steel stiffener with manufacturer's standard insulation.
 - 2. Frames:
 - a. Materials: Metallic-coated steel sheet, minimum thickness of 16-gauge (0.067 inch), with minimum A60 (ZF180) coating.
 - b. Construction: Full profile welded.

2.5 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
 - 2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches (610 mm) of frame height above 7 feet (2.1 m).
 - 3. Postinstalled Expansion Anchor: Minimum 3/8-inch- (9.5-mm-) diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
- B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.
- C. Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than 2-inch (51-mm) height adjustment. Terminate bottom of frames at top of underlayment.
- D. Material: ASTM A 879/A 879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.
 - 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M; hot-dip galvanized according to ASTM A 153/A 153M, Class B.

2.6 MATERIALS

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- C. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- D. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- F. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- G. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- H. Glazing: Comply with requirements in Section 08 8000 "Glazing."

- I. Filler: 3M Bondo.

2.7 FABRICATION

- A. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch (19 mm) beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
- B. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
1. Sidelite and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding.
 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- C. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.
 3. Prepare and coordinate hollow-metal frames for all electrical hardware and raceway requirements.
- D. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with mitered hairline joints.
1. Provide stops and moldings flush with face of door, and with square stops unless otherwise indicated.
 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
 4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
 5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.

- E. Steel Sound Control Door Fabrication: Sound control doors 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.
 - 1. Comply with requirements in NFPA 80 for fire-rated and smoke control doors.
 - 2. Seamless Edge Construction: Fabricate doors with faces joined at vertical edges by welding; welds shall be ground, filled, and dressed to make them invisible and to provide a smooth, flush surface.
 - 3. Exterior Doors: Close top edges flush and seal joints against water penetration. Provide weep-hole openings in bottom of exterior doors to permit moisture to escape.
 - 4. Glazed Lites: Factory install glazed lites according to requirements of tested assembly to achieve STC rating indicated. Provide fixed stops and moldings welded on secure side of door.
 - 5. Hardware Preparation: Factory prepare sound control doors to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping.
 - a. Reinforce doors to receive nontemplated mortised and surface-mounted door hardware.
 - b. Locate door hardware as indicated, or if not indicated, according to NAAMM-HMMA 831, "Recommended Hardware Locations for Custom Hollow Metal Doors and Frames."
 - 6. Tolerances: Fabricate doors to tolerances indicated in NAAMM-HMMA 865.

2.8 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
 - 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

A. Hollow-Metal Frames: Comply with SDI A250.11.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
 - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
 - b. Install frames with removable stops located on secure side of opening.
2. Fire-Rated Openings: Install frames according to NFPA 80.
3. Floor Anchors: Secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
4. Solidly pack mineral-fiber insulation inside frames at interior frames.
5. Fill exterior door frames with spray insulation. Fill voids between rough opening and door frames after setting frames completely to return with sufficient space for backer and sealant.
6. In-Place Concrete Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill flush with filler and make smooth, flush, and invisible on exposed faces. Exposed face fasteners are not permitted.
7. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

B. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.

1. Non-Fire-Rated Steel Doors: Comply with SDI A250.8.
2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
3. Smoke-Control Doors: Install doors according to NFPA 105.

C. Glazing: Comply with installation requirements in Section 08 8000 "Glazing" and with hollow-metal manufacturer's written instructions.

3.3 CLEANING AND TOUCHUP

A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

- B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
- C. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 08 1113

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SECTION 08 7100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Door hardware.
 - 2. Door hardware sets.

- B. Related Requirements:

- 1. Section 08 1113 "Hollow Metal Doors and Frames" for coordination of door hardware with steel doors and frames.
 - 2. Door and Frame Schedule in the Drawings.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Shop Drawings: For electrified door hardware.

- 1. Include diagrams for power, signal, and control wiring.
 - 2. Include details of interface of electrified door hardware and building safety and security systems.

- C. Door hardware schedule.

- D. Keying schedule.

1.5 INFORMATIONAL SUBMITTALS

- A. Sample warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.7 QUALITY ASSURANCE

- A. Hardware Manufacturer Responsibility: The manufacturer's representative for the locking devices and closing devices shall inspect and approve, in writing, the installation of their products. Report hardware installed incorrectly to the Architect prior to the Architect's final punch list.
- B. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and of an Architectural Hardware Consultant who is available during the course of the Work to consult Contractor, Architect, and Owner about door hardware and keying.
 - 1. Scheduling Responsibility: Preparation of door hardware and keying schedule.
 - 2. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- C. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as an Architectural Hardware Consultant (AHC) and an Electrified Hardware Consultant (EHC).

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Three years from date of Substantial Completion unless otherwise indicated below:
 - a. Electromagnetic Locks: Five years from date of Substantial Completion.
 - b. Exit Devices: Two years from date of Substantial Completion.
 - c. Manual Closers: 10 years from date of Substantial Completion.
 - d. Concealed Floor Closers: 10 years from date of Substantial Completion.
 - e. Cylindrical Locksets: Seven years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

- A. Provide products listed in this Section without substitution on new and modernization projects, unless the substitution is specifically approved by the Owner (Corvallis School District), prior to bid date.
- B. The purpose of this list is to support the Owner's standardization of door hardware. The maintenance department maintains the following hardware and has trained their personnel in maintaining these products.

DOOR HARDWARE

DESCRIPTION	MANUFACTURER	MODEL/SERIES	FINISH
<u>Hanging Devices</u>			
Butt Hinges	Ives McKinney Stanley	5BB1 4.5 x 4.5 NRP (at exterior) 5BB1 4.5 x 4.5 (interior) 4 Hinges on exterior, high use & oversized doors	630 652
Continuous Hinges		Not Allowed	
<u>Securing Devices</u>			
Cylindrical Locks	Schlage	ND series SPA Lever design JD (less I/C core) ND93JD SPA at classrooms ND96JD SPA at storerooms	626
Mortise Locks	Schlage	L9456J with ADA thumb turn at Unisex restrooms	626
Cylinders	Schlage	Primus Level 9G – Interchangeable Core. Consult Owner for keying.	626
Exit Device	Von Duprin	98 Series Rim devices - add F for fire rated. XP98NL at exterior single doors. XP98NL w/ VR Trim at exterior pairs. 98QEL (At Card access doors) 98-2 when exit devices are used in classrooms. Classroom Security.	626

DESCRIPTION	MANUFACTURER	MODEL/SERIES	FINISH
		<p>Keyed Removable mullions at all pairs-Mullion Storage Kit at each pair.</p> <p>Mullion stabilizer at all pairs</p> <p>For QEL devices use EPT and VD Power supply</p> <p>QEL = Quiet motor driven latch retraction.</p>	
Flushbolts	Ives DCI	Use Rim Exit Devices and Keyed Removable Mullion in lieu of flushbolts where possible.	
Coordinators	Ives	Not allowed – Use Rim Exit Device w/KRM where possible	
<u>Closing Devices</u>			
Door Closers	LCN	<p>011 / 4111 Series - Use EDA for Parallel Arm applications. Cush, Spring Cush, HO and HCUSH where necessary. Use Drill & Tap Machine Screws use Thru Bolts on Wood Doors.</p> <p>Self-Reaming / Self Tapping screws are not allowed</p>	
Auto Operators	LCN	4642 (Push side mounting), 4631 (pull side mounting)	
<u>Stops & Holders</u>			
Door Stops / Holders	Ives	WS401CCV or CVX Must have backing at sheetrock walls, floor mount where possible. Holders integrated with door closer as in 4111 H-Spring Cush	630

DESCRIPTION	MANUFACTURER	MODEL/SERIES	FINISH
Overhead Stops		900s at Wood Doors 100S-ADJ at HM Doors	630
Electronic Hold-Opens	LCN	SEM 7800 series wall magnets	Alum.
<u>Accessories</u>			
Threshold/Astragal/Gasketing/Door Bottoms	Pemko National Guard	Brush type Door Bottoms (no rubber) Brush type Astragals (no rubber) Thresholds solid aluminum.	Alum
Kickplates	Ives BBW Trmco	8400 10" x 2" LDW x B4E x .050 (Single doors) 8400 10" x 1" LDW x B4E x .050 (Pair doors)(Mount kick plates at all exterior doors, restrooms, custodian closets, at all doors with closers and/or any area subjected to abuse)	630
Push/Pulls	Ives BBW Trmco	8200 4" x 16" 8302 x 6" handle VR914NL At exterior exit devices when needed.	630
<u>Miscellaneous Information:</u>			
Exterior Doors Aluminum Doors Total Door	Special-Lite Total Door	Consult Owner. Consult Owner (if aluminum doors are necessary use hardware in section 08700) Total Door not allowed.	

DESCRIPTION	MANUFACTURER	MODEL/SERIES	FINISH
Hollow Metal Doors & Frames	Steelcraft Ceco Curries	Exterior and Interior frames to be grouted and a minimum 14ga. material. Frames to have high frequency hinge reinforcing. Exterior and Interior doors to be minimum 16ga. Doors to have 14Ga. U channel Reinforcement for Locks, Closers and Exits.	
Cabinet Locks / Padlocks	Olympis	100DR & 200DW Series with integral back plate for mounting. Master Keyed. KS23 Series Padlocks	

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Where fire-rated doors are indicated, provide door hardware complying with NFPA 80 that is listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
- B. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that complies with requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
 - 1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at the tested pressure differential of 0.3-inch wg (75 Pa) of water.
- C. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. Means of Egress Doors: Latches do not require more than 15 lbf (67 N) to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- E. Accessibility Requirements: For door hardware on doors in an accessible route, comply with ICC A117.1.

2.3 SCHEDULED DOOR HARDWARE

- A. Provide products for each door that comply with requirements indicated in Part 2 and the door hardware Sets listed at end of this Section.

2.4 HINGES

- A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.

2.5 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: As indicated in Door Hardware Sets.
- B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
 - 1. Bored Locks: Minimum 1/2-inch (13-mm) latchbolt throw.
 - 2. Deadbolts: Minimum 1.25-inch (32-mm) bolt throw.
- C. Lock Trim:
 - 1. Description: Insert description or manufacturer's design designation.
 - 2. Levers:
 - a. Basis-of-Design: "Sparta" (SPA) Lever Design by Schlage.
 - 3. Escutcheons (Roses): Wrought brass.
- D. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.
 - 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 - 2. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.
- E. Bored Locks: BHMA A156.2; Grade 1; Series 4000.

2.6 AUXILIARY LOCKS

- A. Bored Auxiliary Locks: BHMA A156.36: Grade 1; with strike that suits frame.

2.7 EXIT LOCKS AND EXIT ALARMS

- A. Exit Locks and Alarms: BHMA A156.29, Grade 1.

2.8 MANUAL FLUSH BOLTS

- A. Manual Flush Bolts: BHMA A156.16; minimum 3/4-inch (19-mm) throw; designed for mortising into door edge.

2.9 AUTOMATIC AND SELF-LATCHING FLUSH BOLTS

- A. Automatic and Self-Latching Flush Bolts: BHMA A156.16; minimum 3/4-inch (19-mm) throw; designed for mortising into door edge. Include wear plates.

2.10 EXIT DEVICES AND AUXILIARY ITEMS

- A. Exit Devices and Auxiliary Items: BHMA A156.3.

2.11 LOCK CYLINDERS

- A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver. Provide cylinder from same manufacturer of locking devices.

2.12 KEYING

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, appendix. Provide one extra key blank for each lock.

- 1. Existing System:

- a. Master key or grand master key locks to Owner's existing system.
 - b. Re-key Owner's existing master key system into new keying system.

- B. Keys: Nickel silver.

- 1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:

- a. Notation: "DO NOT DUPLICATE."

2.13 KEY CONTROL SYSTEM

- A. Key Control Cabinet: BHMA A156.28; metal cabinet with baked-enamel finish; containing key-holding hooks, labels, two sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers; with key capacity of percent of the number of locks.

- 1. Wall-Mounted Cabinet: Grade 1 cabinet with hinged-panel door equipped with key-holding panels and pin-tumbler cylinder door lock.

2.14 OPERATING TRIM

- A. Operating Trim: BHMA A156.6; stainless steel unless otherwise indicated.

2.15 ACCESSORIES FOR PAIRS OF DOORS

- A. Coordinators: BHMA A156.3; consisting of active-leaf, hold-open lever and inactive-leaf release trigger; fabricated from steel with nylon-coated strike plates; with built-in, adjustable safety release.

- B. Astragals: BHMA A156.22.

2.16 SURFACE CLOSERS

- A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written instructions for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

2.17 MECHANICAL STOPS AND HOLDERS

- A. Wall- and Floor-Mounted Stops: BHMA A156.16.

2.18 DOOR GASKETING

- A. Door Gasketing: BHMA A156.22; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
- B. Maximum Air Leakage: When tested according to ASTM E 283 with tested pressure differential of 0.3-inch wg (75 Pa), as follows:
 - 1. Smoke-Rated Gasketing: 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) of door opening.
 - 2. Gasketing on Single Doors: 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) of door opening.
 - 3. Gasketing on Double Doors: 0.50 cfm per foot (0.000774 cu. m/s per m) of door opening.

2.19 THRESHOLDS

- A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.

2.20 METAL PROTECTIVE TRIM UNITS

- A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch- (1.3-mm-) thick stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.

2.21 FINISHES

- A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 - 2. Custom Steel Doors and Frames: HMMA 831.
 - 3. Wood Doors: DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors."

- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
- C. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- D. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 - 1. Replace construction cores with permanent cores as supplied and directed by Owner.
- E. Key Control Cabinet: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- F. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 07 9200 "Joint Sealants."
- G. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
- H. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
 - 1. Do not notch perimeter gasketing to install other surface-applied hardware.
- I. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- J. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.2 ADJUSTING

- A. Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
- B. The manufacturer's representative for the door closers shall inspect and adjust all door closers at the completion of the project. The HVAC system shall be completed and balanced before the door closers and adjusted.

3.3 DOOR HARDWARE

- A. See Door Schedule on Drawings for hardware set assigned to each door. Schedule a door hardware set for each unique door hardware configuration required for Project. Identify each set with a unique number designation.

3.4 DOOR HARDWARE SCHEDULE (SETS)

HW SET # C049N

Openings:

D44C D44D

Each door or doors to have:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	652	IVE
1	EA	VANDL STOREROOM LOCK	ND96JD SPA	626	SCH
1	EA	PRIMUS CORE	20-740 LEVEL 9G	626	SCH
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

END OF SECTION 08 7100

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SECTION 09 2216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior partitions.
2. Suspension systems for interior ceilings and soffits.
3. Grid suspension systems for gypsum board ceilings.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

- ##### A. Product Certificates: For each type of code-compliance certification for studs and tracks.
- ##### B. Evaluation reports for firestop tracks, post-installed anchors and power-actuated fasteners.

1.4 QUALITY ASSURANCE

- ##### A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Steel Stud Manufacturers Association.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- ##### A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.
- ##### B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- ##### C. Horizontal Deflection: For wall assemblies, limited to 1/240 of the wall height based on horizontal loading of 10 lbf/sq. ft.

2.2 FRAMING SYSTEMS

- ##### A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.

2. Protective Coating: ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized unless otherwise indicated.
 - a. Provide G60 (Z180) where in contact with exterior framing and exterior concrete walls.
- B. Studs and Tracks: ASTM C 645.
 1. Steel Studs and Tracks:
 - a. Minimum Base-Metal Thickness: As required by performance requirements for horizontal deflection.
- C. Slip-Type Head Joints: Where indicated, provide one of the following:
 1. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- D. Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
 1. Minimum Base-Metal Thickness: As indicated on Drawings.
- F. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-metal thickness, with minimum 1/2-inch-wide flanges.
 1. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch-thick, galvanized steel.
- G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
 1. Minimum Base-Metal Thickness: As indicated on Drawings.
 2. Depth: As indicated on Drawings.
- H. Resilient Furring Channels: 1/2-inch-deep, steel sheet members designed to reduce sound transmission.
 1. Configuration: Asymmetrical.
- I. Cold-Rolled Furring Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges.
 1. Depth: As indicated on Drawings.
 2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.0329 inch.

- J. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum uncoated-metal thickness of 0.0179 inch, and depth required to fit insulation thickness indicated.

2.3 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.
- B. Hanger Attachments to Concrete:
 - 1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 or AC193 as appropriate for the substrate.
 - a. Uses: Securing hangers to structure.
 - b. Type: Torque-controlled, expansion anchor.
 - c. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
 - d. Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.
 - 2. Power-Actuated Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.
- D. Flat Hangers: Steel sheet, in size indicated on Drawings.
- E. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch and minimum 1/2-inch-wide flanges.
 - 1. Depth: As indicated on Drawings.
- F. Furring Channels (Furring Members):
 - 1. Cold-Rolled Channels: 0.0538-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges, 3/4 inch deep.
 - 2. Steel Studs and Tracks: ASTM C 645.
 - a. Minimum Base-Metal Thickness: As required for performance indicated.
 - b. Depth: As indicated on Drawings.
 - 3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.
 - a. Minimum Base-Metal Thickness: As required for performance indicated.
 - 4. Resilient Furring Channels: 1/2-inch-deep members designed to reduce sound transmission.
 - a. Configuration: Asymmetrical or hat shaped; as indicated.

- G. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

2.4 AUXILIARY MATERIALS

- A. Isolation Strip at Exterior Walls: Provide one of the following:
 - 1. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
 - 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.2 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
 - 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 - 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.

- b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
 - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
 - 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
 - 4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
 - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
 - 5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
- E. Direct Furring:
 - 1. Screw to wood framing.
 - 2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
- F. Z-Shaped Furring Members:
 - 1. Erect insulation, specified in Section 07 2100 "Thermal Insulation," vertically and hold in place with Z-shaped furring members spaced 24 inches o.c.
 - 2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
 - 3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.
- G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.3 INSTALLING CEILING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
 - 1. Hangers: 48 inches on center.
 - 2. Carrying Channels (Main Runners): 48 inches on center.
 - 3. Furring Channels (Furring Members): 24 inches on center.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

- C. Suspend hangers from building structure as follows:
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
 - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 5. Do not attach hangers to steel roof deck.
 6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.
- F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- G. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 09 2216

SECTION 09 2900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Interior gypsum board.
 - 2. Tile backing panels.
 - 3. Acoustical joint sealant.
 - 4. Acoustical blankets (sound attenuation blankets), INSUL-4.
 - 5. Trim and accessories.

1.3 SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include installation instructions for fire-rated assemblies.

1.4 QUALITY ASSURANCE

- A. Mockups: Build mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and to set quality standards for materials and execution.
 - 1. Build mockups for the following:
 - a. Each level of gypsum board finish indicated for use in exposed locations.
 - 2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
 - 3. Simulate finished lighting conditions for review of mockups.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 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 E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

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

2.3 INTERIOR GYPSUM BOARD

- A. Gypsum Wallboard: ASTM C 1396/C 1396M.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. American Gypsum.
 - b. CertainTeed Corporation.
 - c. National Gypsum Company.
 - d. PABCO Gypsum.
 - e. USG Corporation.
 - 2. Long Edges: Tapered.
- B. Gypsum Board, Type X (GWB): ASTM C 1396/C 1396M.
 - 1. Thickness: 5/8 inch (15.9 mm).

2. Long Edges: Tapered.
- C. Gypsum Ceiling Board (GWC): ASTM C 1396/C 1396M. Sag-resistant.
1. Thickness: 1/2 inch.
 2. Long Edges: Tapered.
 3. For use in fire-rated construction. Use Type X, 5/8-inch gypsum board.
- D. Abuse-Resistant Gypsum Board: ASTM C 1396/C 1396M gypsum board, tested according to ASTM C 1629/C 1629M.
1. Core: 5/8 inch (15.9 mm), Type X.
 2. Surface Abrasion: ASTM C 1629/C 1629M, meets or exceeds Level 3 requirements.
 3. Indentation: ASTM C 1629/C 1629M, meets or exceeds Level 3 requirements.
 4. Soft-Body Impact: ASTM C 1629/C 1629M, meets or exceeds Level 3 requirements.
 5. Long Edges: Tapered.
 6. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- E. Impact-Resistant Gypsum Board: ASTM C 1396/C 1396M gypsum board, tested according to ASTM C 1629/C 1629M.
1. Core: 5/8 inch (15.9 mm), Type X.
 2. Surface Abrasion: ASTM C 1629/C 1629M, meets or exceeds Level 3 requirements.
 3. Indentation: ASTM C 1629/C 1629M, meets or exceeds Level 3 requirements.
 4. Soft-Body Impact: ASTM C 1629/C 1629M, meets or exceeds Level 3 requirements.
 5. Long Edges: Tapered.
 6. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- F. Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
1. Core: 5/8 inch (15.9 mm), Type X.
 2. Long Edges: Tapered.
 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- 2.4 SPECIALTY GYPSUM BOARD
- A. Gypsum Board, Type C: ASTM C 1396/C 1396M. Manufactured to have increased fire-resistive capability.
1. Thickness: As required by fire-resistance-rated assembly indicated on Drawings.
 2. Long Edges: Tapered.
- 2.5 TILE BACKING PANELS
- A. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or ASTM C 1325, with manufacturer's standard edges.
1. Thickness: 5/8 inch (15.9 mm).

2.6 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
2. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. L-Bead: L-shaped; exposed long flange receives joint compound.
 - d. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - e. Expansion (control) joint.

B. Reveal Trim for Wall Mounted Marker Board:

1. Material: Type 6063 T5 extruded aluminum, clear anodized finish.
2. Size: As detailed on Drawings.
3. Profiles:
 - a. F-Reveal, Model DA.2: F-reveal trim with drywall flange to receive joint compound.
 - b. F-Reveal, Model DA.12: Profile to receive edge of markerboard product.
4. Basis-of-Design Product: "F" Reveal trim by Fry Reglet; www.fryreglet.com.

2.7 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints 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.
3. Fill Coat: For second coat, use setting-type, sandable topping compound.
4. Finish Coat: For third coat, use setting-type, sandable topping compound.
5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.

D. Joint Compound for Tile Backing Panels:

1. Cementitious Backer Units: As recommended by backer unit manufacturer. Coordinate with tiling requirements in Section 09 3013 "Ceramic Tiling."

2.8 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
 - 1. Adhesives shall have a VOC content of 50 g/L or less.
- C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
 - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
 - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Sound-Attenuation Blankets (INSUL-4): 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.
- E. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90. Comply with Section 07 9200 "Joint Sealants" requirements.
 - 1. USG.
 - 2. Tremco, Inc.
 - 3. Hilti, Inc.
 - 4. Specified Technologies, Inc.

PART 3 - EXECUTION

3.1 APPLYING AND FINISHING PANELS

- A. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- B. Comply with ASTM C840.
- C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- D. 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.

- E. Prefill open joints and damaged surface areas.
- F. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- G. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for other finish materials including tile, fiber-reinforced plastic paneling (frp) and acoustical panels. See level 5 for applied graphics.
 - 3. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
 - 4. Level 5: For areas scheduled for applied vinyl wall coverings or wall graphics; and where indicated on Drawings.
- H. Exterior Gypsum Soffit Board Finish: Comply with board manufacturer's written instructions. Provide skim coat.
- I. Cementitious Backer Units: Finish according to manufacturer's written instructions and tiling requirements in Section 09 3013 "Ceramic Tiling."

3.2 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.

END OF SECTION 09 2900

SECTION 09 5113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes acoustical panels and suspension systems for interior ceilings (ACT-#).

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.
- C. Delegated-Design Submittal: For seismic restraints for ceiling systems.
 - 1. Include design calculations for seismic restraints including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- D. Product test reports.
- E. Research reports.
- F. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Ceiling products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 4000 "Quality Requirements," to design seismic restraints for ceiling systems.

- C. Seismic Performance: Suspended ceilings shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- D. 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: 450 or less.

2.2 ACOUSTICAL CEILINGS

A. Acoustical Panels, ACT-1:

- 1. Basis-of-Design Product: Ultima Square Lay-in by Armstrong World Industries; www.armstrongceilings.com.
- 2. Size: 24 inches by 48 inches by 7/8-inch thick.
- 3. NRC: 0.80.
- 4. CAC: 35.
- 5. Light Reflectance: 0.87.
- 6. Fire Performance: Class A.
- 7. Edge: Square.
- 8. Surface color: Manufacturer's "White."
- 9. Suspension System: Prelude XL, 15/16-inch wide exposed "T" grid; white.

B. Acoustical Panels, ACT-2:

- 1. Basis-of-Design Product: Capz Optima by Armstrong World Industries; www.armstrongceilings.com.
- 2. Size: Ceiling clouds; size varies; see reflected ceiling plans.
- 3. NRC: 0.90.
- 4. Light Reflectance: 0.90.
- 5. Fire Performance: Class A.
- 6. Edge: Reverse tegular.
- 7. Surface color: Manufacturer's "White."
- 8. Suspension System: Prelude XL, 15/16-inch wide exposed "T" grid with threaded studs, upright clips and stud caps for securing panels.

C. Acoustical Panels, ACT-3:

- 1. Basis-of-Design Product: TechZone Ceiling System by Armstrong World Industries; www.armstrongceilings.com.
- 2. Sizes: Combination of two panels; see reflected ceiling plans for layout.
 - a. Ultima Panels: Model 1913; 24 inches by 48 inches by 3/4-inch thick.
 - b. Optima Panels: Model 3160; 48 inches by 48 inches by 1-inch thick.
- 3. NRC: Optima, 0.95; Ultima, 0.75.
- 4. CAC: Optima, N/A; Ultima, 35.
- 5. Light Reflectance: 0.90.
- 6. Fire Performance: Class A.
- 7. Edge: Square lay-in.

8. Surface color: Manufacturer's "White."
9. Suspension System: Prelude XL, 15/16-inch wide exposed "T" grid; white.
10. Perimeter Trim: Standard wall angle.

2.3 METAL SUSPENSION SYSTEM

- A. General: Provide the basis-of-design suspension system scheduled on Drawings.
- B. Metal Suspension-System Standard: Manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C635/C635M.
- C. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- D. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished 15/16-inch-wide metal caps on flanges.
 1. Structural Classification: Heavy-duty system.
 2. End Condition of Cross Runners: Override (stepped) type.
 3. Face Design: Flat, flush.
 4. Cap Material: Cold-rolled steel.
 5. Cap Finish: Painted white.

2.4 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- B. Hold-Down Clips: Manufacturer's standard hold-down.
- C. Seismic Clips: Manufacturer's standard seismic clips designed to secure acoustical panels in place during a seismic event.

2.5 METAL EDGE MOLDINGS AND TRIM

- A. Provide edge molding and trim as indicated and as scheduled on Drawings, by named basis-of-design manufacturer.
- B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated.
- B. Layout openings for penetrations centered on the penetrating items.

3.2 INSTALLATION

- A. Install acoustical panel ceilings according to ASTM C636/C636M, seismic design requirements, and manufacturer's written instructions.
- B. 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. Do not use exposed fasteners, including pop rivets, on moldings and trim.
 - 3. Arrange directionally patterned acoustical panels as follows:
 - a. As indicated on reflected ceiling plans.
 - 4. Install hold-down seismic clips in areas indicated; space according to panel manufacturer's written instructions unless otherwise indicated.

3.3 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform inspections.
 - 1. Periodic inspection during the installation of suspended ceiling grids according to ASCE/SEI 7.

END OF SECTION 09 5113

SECTION 09 6500 - RESILIENT FLOORING AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Vinyl composition tile (VCT-#).
 - 2. Resilient base (B-1).
 - 3. Resilient molding and installation accessories.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Submit shop drawings showing layout, finish colors, patterns and textures.
- C. Samples for Verification: For each type of product and finish indicated, in manufacturer's standard-size Samples but not less than 12 inches (300 mm) long, of each resilient product color, texture, and pattern required.
- D. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
- E. Maintenance Data: Maintenance data for installed products in accordance with Division 1 sections. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.
- F. Warranty: Warranty documents specified herein

1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Provide resilient accessories with a critical radiant flux classification of Class I, not less than 0.45 W/sq. cm, as determined by testing identical products per ASTM E 648 by a testing and inspecting agency acceptable to authorities having jurisdiction.
- B. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for resilient sheet flooring installation and seaming method indicated.
 - 1. Not all manufacturers train or certify installers. Before retaining subparagraph below, verify availability with manufacturers; retain with "Qualification Data" Paragraph in "Informational Submittals" Article.

2. Engage an installer who employs workers for this Project who are trained or certified by resilient sheet flooring manufacturer for installation techniques required.
- C. 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 for resilient flooring including resilient base and accessories.
 - a. Size: Minimum 100 sq. ft. 8 by 8 feet, for each type, color and pattern in locations indicated.
 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F 10 deg C or more than 90 deg F (32 deg C).

1.6 PROJECT CONDITIONS

- A. Maintain temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive resilient materials during the following time periods:
 1. 48 hours before installation.
 2. During installation.
 3. 48 hours after installation.
- B. After post installation period, maintain temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).
- C. Install resilient products after other finishing operations, including painting, have been completed.

1.7 SEQUENCING AND SCHEDULING

- A. Finishing Operations: Install flooring after finishing operations, including painting and ceiling operations etc., have been completed.

1.8 WARRANTY

- A. Manufacturer's Materials Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.

1. Warranty Period: 1-year limited warranty commencing on Date of Substantial Completion. Notice of any defect must be made in writing to manufacturer within thirty (30) days after buyer learns of the defect.
- B. Limited Wear Warranty: Manufacturer's limited wear warranty of five years for heavy commercial traffic.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient sheet flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 RESILIENT FLOORING

- A. Vinyl Composition Tile Flooring, VCT-1:

1. Basis-of-Design Product: Standard Excelon Imperial Texture Vinyl Composition Tile by Armstrong; www.armstrongflooring.com.
2. Material: Through pattern vinyl composition tile meeting ASTM F 1066, Class 2; ISO 10595, Type 2.
3. Size: 12 inches by 12 inches by 1/8-inch thick.
4. Color: As scheduled on Room Finish and Materials Legend on Drawings.

2.3 Rubber Flooring, RUB:

1. Basis-of-Design Product: Johnsonite MicroTone Rubber Floor Tile by Tarkett; www.tarkettna.com.
2. Material: Homogeneous composition of 100 percent synthetic rubber and colorants to meet performance requirements of ASTM F 1344, Class 1B.
3. Size: 24 inches by 24 inches by 0.125 inch thick.
4. Pattern and Color: As specified in Room Finish and Materials Legend on Drawings.

2.4 RESILIENT WALL BASE

- A. Basis-of-Design Product, B-1: Contractor choice manufacturer.
 1. Color: Black.
 2. Style: Cove for hard-surface floor applications.
 3. Minimum Thickness: 0.125 inch (3.2 mm).
 4. Surface: Smooth.
 5. Height: 4 inches (100 mm).
- B. Lengths: Cut lengths 48 inches (1200 mm) long or coils in manufacturer's standard length.
- C. Outside and Inside Corners: Job-formed.

2.5 RESILIENT MOLDING ACCESSORY

- A. Description: Carpet edge for glue-down applications; reducer strip for resilient floor covering; joiner for tile and carpet; transition strips.
- B. Material: Rubber.
- C. Profile and Dimensions: As indicated.

2.6 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic cement-based formulation provided or approved by resilient product manufacturers for applications indicated.
- B. 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: 50 g/L.
 - b. Floor Adhesives: 60 g/L.
 - 2. Where flooring is installed over gypsum cement underlayment, adhesive shall be approved for use over gypsum underlayment and compliant with gypsum underlayment warranty requirements.
- C. Polish: Provide protective, liquid floor-polish products recommended by flooring manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

2. Remove substrate coatings and other substances that are incompatible with floor covering adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
 4. Moisture Testing: Perform tests recommended by manufacturer.
 5. Provide vapor emission control and mitigation as required.
 6. Proceed with installation only after substrates pass testing.
- C. 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.
- D. Do not install floor coverings until they are same temperature as space where they are to be installed.
1. Move floor coverings and installation materials into spaces where they will be installed at least 72 hours in advance of installation.
- E. Sweep and vacuum clean substrates to be covered by floor coverings immediately before installation.

3.3 INSTALLATION, GENERAL

- A. Comply with manufacturer's written instructions for installing floor coverings.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
- D. Scribe and cut floor coverings to butt neatly and tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings.
- E. Extend floor coverings into toe spaces, door reveals, closets, and similar openings.
- F. Maintain reference markers, holes, or openings that are in place or marked for future cutting by repeating on floor coverings as marked on subfloor. Use chalk or other nonpermanent marking device.
- G. Install floor coverings on covers for telephone and electrical ducts and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of floor covering installed on covers and adjoining floor covering. Tightly adhere floor covering edges to substrates that abut covers and to cover perimeters.
- H. Adhere floor coverings to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints,

3.4 RESILIENT WALL BASE INSTALLATION

- A. Apply wall base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- B. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- C. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- D. Do not stretch wall base during installation.
- E. On masonry surfaces or other similar irregular substrates, fill voids along top edge of wall base with manufacturer's recommended adhesive filler material.
- F. Job-Formed Corners:
 - 1. Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends. Shave back of base at points where bends occur and remove strips perpendicular to length of base that are only deep enough to produce a snug fit without removing more than half the wall base thickness.
 - 2. Inside Corners: Use straight pieces of maximum lengths possible. Form by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate.

3.5 RESILIENT ACCESSORY INSTALLATION

- A. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor coverings that would otherwise be exposed.

3.6 CLEANING AND PROTECTION

- A. 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.
 - a. Do not wash surfaces until after time period recommended by manufacturer.
- B. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.
- C. Floor Polish, Tile Goods: Remove soil, adhesive, and blemishes from flooring surfaces before applying liquid floor polish.
 - 1. Apply three coats of finish.

- D. Cover resilient flooring until Substantial Completion.

END OF SECTION 09 6500

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SECTION 09 9100 – PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Surface preparation and field painting of exposed items and surfaces on the following substrates:

- a. Interior Substrates:

- 1) Concrete.
 - 2) Gypsum board.
 - 3) Hollow-metal work.
 - 4) Steel.
 - 5) Wood.

- b. Exterior Substrates:

- 1) Concrete.
 - 2) Non-primed steel.
 - 3) Galvanized steel.

- B. Related Requirements:

- 1. Section 05 5000 “Metal Fabrications” for shop-primed items.
 - 2. Room Finish and Materials Legend for paint colors (PT-#).

- C. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.

- 1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.

- D. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

- 1. Prefinished items include the following factory-finished components:

- a. Architectural woodwork.
 - b. Acoustical wall panels.
 - c. Finished mechanical and electrical equipment.
 - d. Light fixtures.
2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
 - a. Foundation spaces.
 - b. Furred areas.
 - c. Ceiling plenums.
 - d. Utility tunnels.
 - e. Pipe spaces.
 - f. Duct shafts.
3. Finished metal surfaces include the following:
 - a. Anodized aluminum.
 - b. Stainless steel.
 - c. Chromium plate.
 - d. Copper and copper alloys.
 - e. Bronze and brass.
4. Operating parts include moving parts of operating equipment and the following:
 - a. Valve and damper operators.
 - b. Linkages.
 - c. Sensing devices.
 - d. Motor and fan shafts.
5. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

- E. Select products and materials in this Section for indoor chemical and pollutant source control and/or low-VOC emitting characteristics.

1.3 DEFINITIONS

- A. Volatile Organic Compounds (VOCs): Compounds as defined by the U.S. Environmental Protection Agency (EPA) in 40 CFR § 51.100 (s), (1).
- B. Anti-Corrosive Paints: Coatings formulated and recommended for use in preventing the corrosion of ferrous metal substrates.
- C. Exposed Surfaces: The term “exposed surfaces” includes areas visible when permanent or built-in fixtures, covers, grilles, and similar components are in place. Extend painting in these areas as required to maintain the system integrity and provide desired protection.

1.4 SEQUENCING AND SCHEDULING

- A. Coordinate painting requirements with galvanizer in Section 05 1200 “Structural Steel Framing” for galvanized items scheduled to be painted.

- B. Perform maintenance repainting in the following sequence, which includes work specified in this and other Sections:
 - 1. Dismantle existing surface-mounted objects and hardware except items indicated to remain in place. Tag items with location identification and protect.
 - 2. Verify that temporary protections have been installed.
 - 3. Examine condition of surfaces to be painted.
 - 4. Remove existing paint to the degree required for each substrate and surface condition of existing paint.
 - 5. Apply paint system.
 - 6. Reinstall dismantled surface-mounted objects and hardware unless otherwise indicated.

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of topcoat product indicated.
- C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat indicated.
 - 1. Submit Samples on rigid backing, 8 inches (200 mm) square.
 - 2. Step coats on Samples to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- D. Product List: For each product indicated, include the following:
 - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 - 2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.
- E. Interior Exposed Steel Finish Process Samples:
 - 1. Provide up to 3 sets of samples for review by Architect. Each set of samples to consist of two (2) each of 12-inch by 12-inch size. Coat with metal panel dye as specified.
 - 2. Obtain substrate sample from items noted in Section 05 5000 "Metal Fabrications."
 - a. Sample Set A: Provide one set of samples with Metal Dye Finish. Obtain review comments from Architect.
 - b. Sample Set B: Following review of Sample Set A, provide one set of samples with Metal Dye Finish modified as directed by Architect. Obtain review comments from Architect.
 - c. Sample Set C (If needed to confirm final finish): Following review of Sample Set B, provide one set of samples with Metal Dye Finish modified as directed by Architect. Obtain review comments from Architect. Approved Sample Set C shall be kept at the project construction site and shall be the basis of quality for the final work.
 - 3. Allow adequate time in project schedule for multiple samples and reviews.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run,] that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.7 QUALITY ASSURANCE

- A. All materials, preparation and painting Work shall comply with the requirements of the latest edition of the Architectural Painting Specification Manual by the Master Painters Institute (MPI).
 - 1. All paint manufacturers and products shall be listed under the Approved Product List section of the MPI Painting Manual.
- B. Color Matching: Custom computer-match paint colors to colors scheduled.
- C. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Architect will review final painting as mockup.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 FIELD CONDITIONS

- A. Exterior:
 - 1. Apply paints, including waterborne paints, only when temperature of surfaces to be painted and ambient air temperatures are between (10 and 35 deg C).
 - 2. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F (7 and 35 deg C).
 - 3. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than (3 deg C) above the dew point; or to damp or wet surfaces.
- B. Interior:
 - 1. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
 - 2. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 PAINT MATERIALS, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated, including gloss levels, and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
 - 1. 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. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
- D. Chemical Components of Interior Paints and Coatings: Provide products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and the following chemical restrictions.
 - 1. The following chemicals shall not be used as an ingredient in any of the paints or coatings applied indoors and on-site:
 - a. Aromatic Compounds: The product must contain no more than 1.0% by weight of the sum total of aromatic compounds.
 - b. Halomethanes: Methylene Chloride.
 - c. Chlorinated Ethanes: 1,1,1-trichloroethane.
 - d. Aromatic Solvents: Benzene, Toluene (methylbenzene), Ethylbenzene.
 - e. Chlorinated Ethylenes: Vinyl Chloride.
 - f. Polynuclear Aromatics: Naphthalene.
 - g. Chlorobenzenes: 1,2-dichlorobenzene.
 - h. Phthalate Esters: di (2-ethylhexyl) phthalate, butyl benzyl phthalate, di-n-butyl phthalate, di-n-octyl phthalate, diethyl phthalate, dimethyl phthalate.
 - i. Miscellaneous Semi-Volatile Organics: Isophorone. Metals and their compounds: Antimony, Cadmium, Hexavalent Chromium, Lead, Mercury.
 - j. Preservatives (Anti-Fouling Agents): Formaldehyde.
 - k. Ketones: Methyl ethyl ketone, Methyl isobutyl Ketone.
 - l. Miscellaneous Volatile Organics: Acrolein, Acrylonitrile.
 - 2. Volatile Organic Compounds: The volatile organic compound (VOC) concentrations (in grams per liter) of the paint or coating shall not exceed those listed below if the paint or coating is applied indoors, on-site. VOCs shall be tested in accordance with the U.S. Environmental Protection Agency (EPA) Test Method 24. The calculation of VOC shall exclude water, exempt solvents, and tinting color added at the point of sale.
 - a. Flat Interior Coatings: 50 g/L.
 - b. Non-Flat Interior Coatings: 150 g/L.
 - c. Gloss Anti-Corrosive Interior Coatings: 250 g/L.

- d. Semi-Gloss Anti-Corrosive Interior Coatings: 250 g/L.
- e. Flat Anti-Corrosive Interior Coatings: 250 g/L.
- f. Floor Coatings: 250 g/L.
- g. Flow Coatings: 420 g/L.
- h. Pre-Treatment Wash Primers Coatings: 420 g/L.
- i. Sanding Sealers (Non-Lacquer): 350 g/L.
- j. Specialty Primers, Sealers, and Undercoats: 350 g/L.

- E. Transition Coat: Paint manufacturer's recommended coating for use where a residual existing coating is incompatible with the paint system.

2.2 MANUFACTURERS

- A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products by the following:
 - 1. Interior, Latex: Duration by Sherwin-Williams.
 - 2. Exterior: Provide systems indicated by Sherwin Williams.
 - 3. Other Manufacturers, where approved by District: Where products meet project requirements and are an MPI approved product.
 - 4. Provide all paint and coating products from the same manufacturer to the greatest extent possible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Wood: 15 percent.
 - 3. Gypsum Board: 12 percent.
 - 4. Plaster: 12 percent.
- C. Exterior Substrates:
 - 1. Portland Cement Plaster: Verify that plaster is fully cured.
 - 2. Exterior Gypsum Board: Verify that finishing compound is sanded smooth.
 - 3. Fiber-cement siding panels.
- D. Interior Substrates:
 - 1. Gypsum Board: Verify that finishing compound is sanded smooth.
 - 2. Wood Substrates: 10 percent.
 - 3. Steel: Dry.

- E. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- F. Alkalinity: Do not begin application of coatings unless surface alkalinity is within range recommended in writing by paint manufacturer. Conduct alkali testing with litmus paper on exposed plaster, cementitious, and masonry surfaces.
- G. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATORY CLEANING

- A. General: Use the gentlest, appropriate method necessary to clean surfaces in preparation for painting. Clean all surfaces, corners, contours, and interstices.
- B. Detergent Cleaning: Wash surfaces by hand using clean rags, sponges, and bristle brushes. Scrub surface with detergent solution and bristle brush until soil is thoroughly dislodged and can be removed by rinsing. Use small brushes to remove soil from joints and crevices. Dip brush in solution often to ensure that adequate fresh detergent is used and that surface remains wet. Rinse with water applied by clean rags or sponges.
 - 1. Use industrial degreaser at galvanized steel.

3.3 SUBSTRATE REPAIR

- A. General: Repair substrate surface defects that are inconsistent with the surface appearance of adjacent materials and finishes.
- B. Gypsum-Plaster and Gypsum-Board Substrates:
 - 1. Repair defects including dents and chips more than 1/16 inch in size and where directed by Architect and Owner, and all holes and cracks by filling with gypsum-plaster patching compound and sanding smooth. Remove protruding fasteners.
 - 2. Rout out surface cracks to remove loose, unsound material; fill with patching compound and sand smooth.
 - a. finish patch to match adjacent surfaces with no visible transition. Telegraphing patching through finish coats is not acceptable.

3.4 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated, and with procedures specified in PDCA P4 for inspection and acceptance of surfaces to be painted.
- 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 where present.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
 1. Roughen as required to remove glaze where occurs.
 2. Use mechanical methods or surface preparation where hardeners or sealers have been used to improve curing.
- E. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:
 1. SSPC-SP 3.
- F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- H. Wood Substrate, Shop-Primed:
 1. Remove stains and other materials that would impede installation of coats over primer specified.
 2. Reprime damaged primer.
- I. Wood Substrates:
 1. Scrape and clean knots and apply coat of knot sealer before applying primer.
 2. Sand surfaces that will be exposed to view and dust off.
 3. Prime edges, ends, faces, undersides, and backsides of wood immediately upon delivery.
 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
 5. Reprime over areas with fillers extending approximately 1-inch beyond filler area for overcoat adhesion.
- J. Wood Substrates, Painted:
 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 immediately upon delivery.

- a. Including cabinets, counters, casework, and paneling.
 - b. Include paneling where back faces masonry, plaster, concrete or wet-wall construction.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
 5. Transparent finishing is specified in sections where wood occurs.

3.5 REPAINTING, GENERAL

- A. Comply with manufacturers' written instructions for application methods unless otherwise indicated in this Section.
- B. Prepare surfaces to be painted according to manufacturer's written instructions for each substrate condition.
- C. Apply a transition coat over incompatible existing coatings.
- D. Blending Painted Surfaces: When painting new substrates patched into existing surfaces or touching up missing or damaged finishes, apply coating system specified for the specific substrate. Apply final finish coat over entire surface from edge to edge and corner to corner.
- E. Maintenance Repainting Appearance Standard: Completed work is to have a uniform appearance as viewed by Architect from building interior at 5 feet (1.5 m) away from painted surface.
- F. Execution of the Work: In repainting surfaces, disturb them as minimally as possible and as follows:
 1. Remove failed coatings and corrosion and repaint.
 2. Verify that substrate surface conditions are suitable for repainting.
 3. Allow other trades to repair items in place before repainting.
- G. Mechanical Abrasion: Where mechanical abrasion is needed for the work, use gentle methods, such as scraping and lightly hand sanding, that will not abrade softer substrates, reducing clarity of detail.
- H. Heat Processes: Do not use torches, heat guns, or heat plates.

3.6 APPLICATION

- A. Material Preparation:
 1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
- B. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 3. Paint both sides and edges of doors and entire exposed surface of door frames.
 4. Paint entire exposed surface of window frames and sashes, where scheduled for painting.
 5. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 6. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 7. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- C. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- D. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- E. 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.
- F. Sand lightly between each succeeding enamel or varnish coats.
- G. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
1. Paint the following interior work where exposed in occupied spaces visible to the public:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - h. Other items as directed by Architect.
 2. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces, with a nonspecular black paint or color selected by Architect.

3.7 CLEANING AND PROTECTING

- A. At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.

- B. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.
- C. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.
 - 1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.8 INTERIOR PAINT SYSTEM SCHEDULE

- A. General: All interior paint systems shall be institutional, low-odor, low-VOC.
- B. Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 - 1. System: As recommended by manufacturer and compatible with substrate.
- C. Interior Steel Doors and Frames (Factory primed), Access Doors, Fire Cabinets where scheduled to match:
 - 1. Primer: Transition coat where required for adhesion or compatibility.
 - 2. Finish Coats: Two coats, multi-surface acrylic.
- D. Gypsum Board Substrates:
 - 1. Latex System:
 - a. Prime Coat: PVA primer by topcoat manufacturer.
 - b. Intermediate Coat: Latex, interior, matching topcoat.
 - c. Topcoat: Two coats, Latex, interior.
 - 2. Sheen:
 - a. Walls: Semi-gloss.
 - b. Ceilings: Semi-gloss.
- E. Gypsum Board Substrates: Moisture-resistant finish; At janitor, mechanical, restrooms and toilet rooms:
 - 1. System:
 - a. Prime Coat: Acrylic, interior.
 - b. Intermediate Coat: Match topcoat.
 - c. Topcoat: Two coats, Waterborne epoxy coating, interior.
 - 2. Sheen:
 - a. Walls: Semi-gloss.
 - b. Ceilings: Semi-gloss.

- F. Interior Steel - Dry Fall: Metals; exposed structure and overhead-mounted services, including steel deck, structural steel, metal fabrications, galvanized ducts, galvanized conduit, galvanized piping, and as indicated on Drawings.
 - 1. Primer: Spot prime with Rust Inhibitive Primer MPI #107.
 - 2. W.B. Dry Fall Epoxy MPI #155, semi-gloss.
- G. Interior Steel – Metal Fabrications:
 - 1. Metal Dyes and Stains Product: Flood Company, Penetrol Oil-Based Coating Additive; www.flood.com., or approved substitution.
 - 2. Apply metal dyes to exposed surfaces of Interior Steel Finish Panel to achieve dark - variegated color. The intended result is a metal panel with a clear finish, which shows the character of the steel including minor imperfections, rust, mill marks, etc. Coating to darken metal but not to turn it opaque black. See website for more information: <https://www.youtube.com/watch?v=XXYzGZkOKA4>.
 - 3. Apply as recommended by manufacturer.
 - 4. Coat: Single coat.
- H. Wood Substrates: Non-traffic.
 - 1. Latex System:
 - a. Prime Coat: Primer, latex, for interior wood.
 - b. Intermediate Coat: Latex, interior, matching topcoat.
 - c. Topcoat: Two coats, Latex, interior.
 - 2. Sheen: Semi-gloss.
- I. Wood Substrates: Traffic surfaces, stage flooring.
 - 1. Alkyd Floor Enamel System:
 - a. Prime Coat: Floor enamel, alkyd, matching topcoat.
 - b. Intermediate Coat: Floor enamel, alkyd, matching topcoat.
 - c. Topcoat: Floor enamel, alkyd.
 - 1) Gloss: As indicated.

3.9 EXTERIOR PAINT SYSTEM SCHEDULE

- A. Galvanized-Metal Substrates:
 - 1. Acrylic System: Industrial Enamel.
 - a. Prime Coat: Primer, zinc rich, water based. Provide where not shop-primed.
 - b. Intermediate Coat: Acrylic enamel, exterior, matching topcoat.
 - c. Topcoat: Two coats, Acrylic enamel, exterior, semi-gloss.
 - 2. Sheen: Semi-gloss.

B. Concrete Substrates:

1. Elastomeric Coating:

- a. Prime Coat: one coat of concrete and masonry primer at 3.2 mils dry film thickness.
- b. Intermediate Coat: 100 percent acrylic elastomeric coating at 4.0-6.0 mils dry film thickness.
- c. Topcoat: Two coats, 100 percent acrylic elastomeric coating at 4.0-6.0 mils dry film thickness.

2. Sheen: Semi-gloss.

C. Steel Substrates:

1. Primer: Shop primed; primer, multi-surface acrylic, anti-corrosive, for metal.
2. Intermediate Coat: Match topcoat.
3. Topcoat: Two coats, multi-surface acrylic.

3.10 COLOR SCHEDULE

- A. See Drawings for Room Finish and Materials Legend for paint colors, PT-#.
- B. Coordinate finish colors with systems indicated in other Sections and in the Room Finish and Materials Legend.
- C. Basis-of-Design Manufacturer is for color only. Provide color match where different paint manufacturer is used.
- D. Where surfaces are scheduled for primer only, provide primer indicated for substrate in systems listed above.

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SECTION 10 1400 - SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Room-identification signs.
 - 2. Door-identification signs.
 - 3. Interior informational signs.
 - 4. Emergency evacuation maps.
 - 5. Interior wayfinding signage.
 - 6. Exterior building signage.

1.3 SUBMITTALS

- A. Product Data.
- B. Shop Drawings.
- C. Samples for Verification.
- D. Sign Schedule.
- E. Qualification Data.
- F. Sample Warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications.

1.6 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Thermal Movements: For exterior signs, allow for thermal movements from ambient and surface temperature changes.
- B. Accessibility Standard: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for signs.

2.2 SIGNS

- A. Panel Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles.
- B. Room-Identification Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles.

2.3 SIGN MATERIALS

- A. Aluminum Sheet and Plate: ASTM B209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
- B. Aluminum Extrusions: ASTM B221, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
- C. Steel Materials:
 - 1. Metallic-Coated Steel Sheet: ASTM A653, G90 coating, either commercial or forming steel.
 - 2. Steel Sheet: Uncoated, cold-rolled, ASTM A1008, commercial steel, Type B, exposed electrolytic zinc-coated, ASTM A879, Coating Designation 08Z, with steel-sheet substrate according to ASTM A1008, commercial steel, exposed].
 - 3. Steel Members Fabricated from Plate or Bar Stock: ASTM A529 or ASTM A572, 42,000-psi minimum yield strength.
- D. Stainless-Steel Sheet: ASTM A240 or ASTM A666, Type 304, stretcher-leveled standard of flatness.
- E. Acrylic Sheet: ASTM D4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).
- F. Polycarbonate Sheet: ASTM C1349, Appendix X1, Type II (coated, mar-resistant, UV-stabilized polycarbonate), with coating on both sides.
- G. Fiberglass Sheet: Multiple laminations of glass-fiber-reinforced polyester resin with UV-light stable, colorfast, nonfading, weather- and stain-resistant, colored polyester gel coat, and with manufacturer's standard finish.
- H. PVC Sheet: Manufacturer's standard, UV-light stable, PVC plastic.

- I. Plastic-Laminate Sheet: NEMA LD 3, general-purpose HGS grade, 0.048-inch nominal thickness.
- J. Vinyl Film: UV-resistant vinyl film of nominal thickness indicated, with pressure-sensitive, permanent adhesive on back; die cut to form characters or images as indicated and suitable for exterior applications.
- K. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

2.4 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signage, noncorrosive and compatible with each material joined.
- B. Adhesive: As recommended by sign manufacturer.
- C. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, with adhesive on both sides.
- D. Magnetic Tape: Manufacturer's standard magnetic tape with adhesive on one side.
- E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187.

2.5 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
- B. Surface-Engraved Graphics: Machine engrave characters and other graphic devices into panel surface indicated to produce precisely formed copy, incised to uniform depth.
- C. Subsurface-Applied Graphics: Apply graphics to back face of clear face-sheet material to produce precisely formed image. Image shall be free of rough edges.
- D. Shop- and Subsurface-Applied Vinyl: Align vinyl film in final position and apply to surface. Firmly press film from the middle outward to obtain good bond without blisters or fishmouths.
- E. Signs with Changeable Message Capability: Fabricate signs to allow insertion of changeable messages as follows:
- F. Brackets: Fabricate brackets, fittings, and hardware for bracket-mounted signs to suit sign construction and mounting conditions indicated. Modify manufacturer's standard brackets as required.

2.6 GENERAL FINISH REQUIREMENTS

- A. Directional Finishes: Run grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.
- B. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

2.7 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, Class I, 0.018 mm or thicker.
- B. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

2.8 METALLIC-COATED STEEL FINISHES

- A. Factory Prime Finish: After cleaning and pretreating, apply an air-dried primer compatible with the organic coating to be applied over it.
- B. Baked-Enamel or Powder-Coat Finish: After cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat to a minimum dry film thickness of 2 mils.

2.9 STEEL FINISHES

- A. Factory Prime Finish: After surface preparation and pretreatment, apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer.
- B. Baked-Enamel or Powder-Coat Finish: After cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat to a minimum dry film thickness of 2 mils.

2.10 STAINLESS-STEEL FINISHES

- A. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 1. Directional Satin Finish: No. 4.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
- B. Room-Identification Signs and Other Accessible Signage: Install in locations on walls as indicated and according to accessibility standard.

END OF SECTION 10 1400

CSD - CVHS FIBER BACKBONE REPLACEMENT

PIVOT ARCHITECTURE PROJECT NO. 1832.02

ISSUED FOR CONSTRUCTION

AUGUST 28, 2020

