

Project Manual

City of Lowell

Maggie Osgood Library and City Hall Renovations

February 28, 2022



WILSON
ARCHITECTURE

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SECTION 00 0101

PROJECT TITLE AND INFORMATION PAGE

1. Project Identification

Owner	City of Lowell 107 East 3 rd St., Lowell, OR 97452
Owner's Contact	Jeremy Caudle, City Administrator
Project Name	Maggie Osgood Library and City Hall Renovation
Project Site Location	70 N. Pioneer St., Lowell, OR 97452
Architects' Project Number	21031

2. Project Description

The project is located at a former church building location at 70 N. Pioneer Street in Lowell, OR. The existing building is approximately 2,880 square feet of wood framed construction.

The Project consists of renovations to the existing building to accommodate a new library and city hall spaces within the existing building. The work includes some demolition to existing walls, finishes, and ceilings, and new walls, doors, finishes, ceiling, etc to create the new spaces. Work at the building envelope is limited to accommodation of new doors and windows at the walls, and new plumbing vents and tubular skylights at the roof. The site improvements are limited to modifications at an isolated locations to the sidewalk and new pavement markings and signage for accessible parking. MEP improvements include removal of some existing plumbing fixtures and associated work, replacement of existing ductwork with new ductwork, and modifications to the existing light, power, and data systems.

3. Project Consultants

Architect	Wilson Architecture Curt Wilson, AIA curt@wilson-architecture.com
Structural Engineer	i.e. Engineering Rob Van Dyke, PE, SE
Mechanical Engineer	Colebreit Engineering Adam Boyd, PE
Electrical Engineer	Colebreit Engineering Michael Nelson



4. Procurement Timetable (all dates 2022)

Bid Documents Available	Monday, February 28 at 9:00 am
Pre-Bid Meeting	Thursday, March 10 at 3:00 pm at the Project Site
Additional Site Visits	Thursday, March 17 from 1:00-5:00 pm at the Project Site Thursday, March 24 from 1:00-5:00 pm at the Project Site

Date of Last Addendum	Monday, March 28 at 5:00 p.m.
Bid Period Closing	Thursday, March 31 at 2:00 p.m.
First-Tier Sub. Disclosure Due	Thursday, March 31 at 4:00 p.m.
Construction Schedule Milestone	See Section 01 1000 – Summary

Note: The Owner and Architect reserve the right to change the schedule or terminate the entire procurement process at their discretion. See Instructions to Bidders and Bid Form for more additional information.

END OF SECTION

SECTION 00 0110
TABLE OF CONTENTS

PROCUREMENT AND CONTRACTING REQUIREMENTS

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

00 0101	Project Title Page
00 0110	Table of Contents
00 0115	List of Drawing Sheets
00 1113	Ad for Bid
00 2113	Instructions to Bidders
00 3100	Available Project Information
00 4100	Bid Form
00 4313	Bid Bond
00 4338	First-Tier Subcontractor Disclosure Form
00 4519	Non-Collusion Affidavit
00 4520	Employee Drug Testing Program
00 5000	Contracting Forms and Supplements
00 5200	Agreement Form
00 5201	Public Contracting Code
00 6112	Performance Bond Form
00 6114	Payment Bond Form
00 6115	Public Works Bond
00 7200	General Conditions
00 7317	Insurance Coverage Requirements
00 7343	Prevailing Wage Requirements

SPECIFICATIONS

DIVISION 01 - GENERAL REQUIREMENTS

01 1000	Summary
01 2000	Price and Payment Procedures
01 2300	Alternates
01 3000	Administrative Requirements
01 3216	Construction Progress Schedule
01 4000	Quality Requirements

- 01 5000 Temporary Facilities and Controls
- 01 6000 Product Requirements
- 01 6023 Substitution Request Form
- 01 7000 Execution and Closeout Requirements
- 01 7419 Construction Waste Management and Disposal
- 01 7800 Closeout Submittals

DIVISION 02 - EXISTING CONDITIONS

- 02 4100 Demolition

DIVISION 03 – CONCRETE

Not Used

DIVISION 04 – MASONRY

Not Used

DIVISION 05 – METALS

Not Used

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

- 06 1000 Rough Carpentry
- 06 2000 Finish Carpentry
- 06 4100 Casework

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

- 07 2100 Thermal Insulation
- 07 2500 Weather Barriers
- 07 4646 Fiber-Cement Siding
- 07 6000 Sheet Metal
- 07 9200 Joint Sealant

DIVISION 08 - DOORS AND WINDOWS

- 08 0607 Door Hardware Schedule
- 08 1100 Metal Doors and Frames
- 08 1416 Flush Wood Doors
- 08 3100 Access Doors and Panels
- 08 5413 Fiberglass Windows

- 08 6200 Tubular Skylights
- 08 7100 Door Hardware
- 08 8000 Glazing

DIVISION 09 – FINISHES

- 09 0601 Color Schedule
- 09 2116 Gypsum Board Assemblies
- 09 2216 Non-Structural Metal Framing
- 09 3000 Tiling
- 09 5100 Acoustical Ceilings
- 09 6500 Resilient Flooring
- 09 6813 Tile Carpeting
- 09 9000 Painting and Coating

DIVISION 10 – SPECIALTIES

- 10 1100 Visual Display Units
- 10 1400 Signage
- 10 2113.19 Plastic Toilet Compartments
- 10 2800 Toilet Accessories
- 10 4400 Fire Protection Specialties

DIVISION 11 – EQUIPMENT

Not Used

DIVISION 12 – FURNISHINGS

- 12 2413 Roller Window Shade
- 12 3600 Countertops

DIVISION 13 - SPECIAL STRUCTURES

Not Used

DIVISION 14 - CONVEYING EQUIPMENT

Not Used

DIVISION 21 - FIRE SUPPRESSION

Not Used

DIVISION 22 – PLUMBING

Not Used

DIVISION 23 – HVAC

23 0593 Testing, Adjusting, and Balancing for HVAC

23 0713 Duct Insulation

23 3113 Metal Ducts

DIVISION 26 – ELECTRICAL

26 0000 Common Work Results for Electrical

26 0519 Low-Voltage Electrical Power Conductors and Cables

26 0526 Grounding and Bonding for Electrical Systems

26 0529 Hangers and Supports for Electrical Systems

26 0533 Raceways and Boxes for Electrical Systems

26 0544 Sleeves and Sleeve Seals for Electrical Raceways and Cabling

26 0553 Identification for Electrical Systems

26 0923 Lighting Control Devices

26 2726 Wiring Devices

26 5000 General Lighting Provisions

DIVISION 27 – COMMUNICATIONS

27 1000 Telephone / Data Structured Wiring System

DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

28 2330 Fire Alarm System

DIVISION 31 – EARTHWORK

Not Used

DIVISION 32 - EXTERIOR IMPROVEMENTS

Not Used

DIVISION 33 – UTILITIES

Not Used

APPENDIX

END OF SECTION

SECTION 00 0115
LIST OF DRAWING SHEETS

SHEET INDEX

T1 TITLE SHEET

G010 BUILDING CODE INFORMATION

D111 DEMO PLAN - FIRST FLOOR
D121 DEMO CEILING PLAN

A001 SITE PLAN
A111 FLOOR PLAN - FIRST FLOOR
A112 FINISH PLAN
A121 CEILING PLAN - FIRST FLOOR
A129 ROOF PLAN

A141 ELEVATIONS
A142 ELEVATIONS
A151 BUILDING SECTION
A160 WALL ASSEMBLIES
A161 DETAILS
A171 INTERIOR ELEVATIONS
A172 INTERIOR ELEVATIONS
A180 DOOR AND WINDOW INFORMATION

M101 MECHANICAL PLAN

E101 ELECTRICAL
E102 LOW VOLTAGE AND FIRE

END OF SECTION

SECTION 00 1113

ADVERTISEMENT FOR BID

1. Invitation to Bid Notice

Notice is hereby given that bids for construction of the Maggie Osgood Library and City Hall Renovation project for the City of Lowell will be received at the date and time and location shown below.

Bid Submission Deadline (Closing)

- Date: Thursday, March 31, 2022 at 2:00 pm.
- Location: Lowell City Hall at 107 E. 3rd Street Lowell, OR 97452

Bidders shall submit bids in a sealed, opaque envelope, plainly marked "Proposals for Construction Services – Maggie Osgood Library and City Hall Renovation". The Bid Opening time will be immediately after the deadline for submission of bids. Bids will be opened at the above location.

2. Project Description

The project is located at a former church building location at 70 N. Pioneer Street in Lowell, OR. The existing building is approximately 2,880 square feet of wood framed construction.

The Project consists of renovations to the existing building to accommodate a new library and city hall spaces within the existing building. The work includes some demolition to existing walls, finishes, and ceilings, and new walls, doors, finishes, ceiling, etc to create the new spaces. Work at the building envelope is limited to accommodation of new doors and windows at the walls, and new plumbing vents and tubular skylights at the roof. The site improvements are limited to modifications at an isolated locations to the sidewalk and new pavement markings and signage for accessible parking. MEP improvements include removal of some existing plumbing fixtures and associated work, replacement of existing ductwork with new ductwork, and modifications to the existing light, power, and data systems.

3. Documents

Files containing the Bid Documents can be downloaded from Oregon Buys (www.oregonbuys.gov) on or after 9:00 a.m. on Monday, February 28, 2022.

Plans and specifications maybe viewed at local area plan centers. Documents will be sent to these plan centers.

- Bay Area Plan Center, Coos Bay
- Central Coast Plan Exchange, Florence
- Daily Journal of Commerce, Portland
- Eugene Builders Exchange, Eugene
- McGraw Hill Construction Dodge, Portland
- Medford Builders Exchange, Medford
- Salem Contractors Exchange, Salem

4. Pre-Bid Meeting

A voluntary (non-mandatory) pre-bid meeting will be held at 3:00 p.m. on Thursday, March 10 at the project site.

Statements made by City representatives at that meeting are not binding on City unless confirmed by written addendum.

An additional Non-Mandatory Pre-Bid Site Visits will be held March 17, 2022 and March 24, 2022 both days from 1:00-5:00 pm at the Project Site to visit the site and building. This is an opportunity for potential bidders an additional opportunity to review existing conditions and meet key participants of the project team.

5. Bid Requirements

Bids must be accompanied by a certified check, cashier's check, irrevocable letter of credit or Bid Bond in an amount equal to not less than ten percent (10%) of the total amount of the bid.

Prevailing wage rates for public works contracts in Oregon are required for this project. No bid will be received or considered by the Owner unless the bid contains a statement that the Bidder will comply with the provisions of ORS 279C.800 to 279C.840 regarding the payment of prevailing rates of wage.

All bidders must be "Equal Opportunity Employers" and comply with the appropriate provisions of state and federal law. In regards to Worker's Compensation, all bidders shall be required to comply with ORS 656.017 or are exempt under ORS 656.126.

Each bid must include a statement by the bidder as to whether the bidder is a resident bidder under ORS 279A.120.

Unless exempt under ORS 279C.800 to 279C.870, the successful bidder must file a \$30,000 Public Works Bond with the Construction Contractors Board prior to beginning work on the project, and certify that all sub-contractors have also filed such bond.

The Owner may reject any bid that does not comply with all prescribed public bidding procedures and requirements, including the requirements to demonstrate the bidder's responsibility under ORS 279C.375(3)(b).

The Owner reserves the right to waive informalities, and for good cause to reject any and all bids after finding that doing so is in the public interest.

No bid will be received or considered unless the bidder is licensed by the Construction Contractors Board or the State Landscape Contractors Board for the work of the project.

Each bidder must submit a disclosure of first-tier subcontractors supplying labor or labor and materials within two hours after the date and time of the deadline when bids are due, in accordance with ORS 279C.370 .

Unless exempt under ORS 279C.800 to 279C.870, all bidders must file a written, certified statement with the City consistent with ORS 279C.845.

6. Questions and Clarifications

Questions to be directed to the project architect, Curt Wilson at Wilson Architecture at curt@wilson-architecture.com.

Questions will be received until 3 hours prior to the deadline for the last addenda as described in Section 00 0101 – Project Info and Title Page.

Addendums will be issued by the Architect and distributed through the same outlets as the distribution of the bid documents.

7. **Published:** February 28, 2022, Register Guard, Oregon Buys, Daily Journal of Commerce

END OF SECTION

SECTION 00 2113

INSTRUCTIONS TO BIDDERS

1. Form of Bid

All bids must be made upon the blank Bid Form attached hereto and must give a lump sum price as required in the Bid Form.

The City reserves the right to reject any or all bids or to accept the bid deemed in the best interest of the City. Without limiting the generality of the foregoing, the City may reject any bid which is incomplete, obscure or irregular; or which is accompanied by an insufficient or irregular Bid Bond.

The bidder shall sign the Bid Form in the blank space provided therefore. All bids must contain the bidder's tax identification number. Bids made by a corporation, general or limited partnership, or L.L.C., shall contain the name and address of such organization, together with names and addresses of officers, partners or managing members. If the bid is made by a corporation, it must be signed by one of the corporate officers with the authority to sign for the corporation; if made by a partnership, by one of the partners.

All bids must be submitted at the time and place, and in the manner prescribed in the Invitation to Bid.

2. Request for Change or Clarification

A bidder may request a change in items in the bid documents, including contract terms and conditions or specifications, by filing a written request with the City not less than five (5) calendar days prior to the bid submission deadline. Such written request for change must include a statement of the grounds for the request and a statement of the desired changes to the contract terms and conditions or specifications.

The City is not obligated to consider a bidder's request for change after the deadline for submitting such protest or request. If the City agrees with the bidder's request, in whole or in part, the City shall issue a written Addendum to the bid documents or specifications.

Prior to the deadline for submitting a written request for change, a bidder may request that the City clarify any provision of the bid documents. The City's clarification to a bidder, whether orally or in writing, shall not change the bid documents and is not binding on the City unless the City amends the bid documents by issuing a written addendum.

If a written addendum is issued by the City, all bidders must provide written acknowledgement, with their bids, of receipt of all issued addenda.

3. Definition of Documents

The Bidding Documents are comprised of the Advertisement for Bid, Instructions to Bidder, Available Project Information, Bid Form, Additional Bid Documents and Certificates, Agreement Form, Performance and Payment Bond, General Conditions, Insurance Requirements, Prevailing Wage Requirements, and Proposed Contract Documents.

The Proposed Contract Documents include Divisions 01-33 of the Project Manual, Addendas issued during Bid Period, and Drawings issued for bidding.

Any person contemplating the submission of a bid and being in doubt as to the meaning or intent of said Bidding Documents should request of the City, in writing, an interpretation thereof. Any interpretation of said Bidding Documents shall be made only in writing by the City or their representative(s).

4. Construction Contractors' Board - State Landscape Contractors' Board

All contractors bidding on public contracts must be licensed with the Construction Contractors' Board or the State Landscape Contractors Board as required by ORS 701.021 or 671.530. Bids must be identified with the Contractors' Board license number. No bids will be considered without this information.

5. Disclosure of First-Tier Subcontractors

When a public improvement contract value is greater than \$100,000, all bidders are required to disclose information about first-tier subcontractors, providing labor or labor and materials, when the contract amount of such first-tier subcontractor is equal to or greater than:

- 1) 5% of the project bid, or \$15,000, whichever is greater; or
- 2) \$350,000 regardless of the percentage of the total bid.

Bidders must disclose the following information about such subcontracts, on the First-Tier Subcontractor Disclosure Form provided by the City and included herein, within two hours of the bid submission deadline:

- 1) The subcontractor's name;
- 2) The subcontract dollar value; and
- 3) The category of work to be performed by the subcontractor.

Any bidder not using subcontractors subject to the above disclosure form, must write "NONE" on the Disclosure Form and sign and submit the form. The City will reject a bid if the bidder fails to submit the Disclosure Form before the deadline.

6. Drug Testing Program

ORS 279C.505(2) requires public improvement contracts to include a provision requiring contractors to demonstrate that they have an employee drug and alcohol testing program in place. All bidders are required to certify, on the Drug Testing Program Certification Form provided by the City and included herein, that they have such program in place. This certification will become part of the Contract if awarded and contractor will be required to maintain such program throughout the performance of the Contract. Failure to maintain a program shall constitute a material breach of the Contract.

7. Prompt Pay Policy - Timely Progress Payments

ORS 279C.570 and 279C.580 require prompt payment to contractors and subcontractors and provides for settlement of compensation disputes between the parties. The City is required to automatically calculate and pay interest on invoices from the contractor when payments become overdue. The interest commences thirty (30) calendar days after receipt of the invoice from the contractor, or fifteen (15) calendar days after the payment is approved by the City, whichever is earlier. The rate of interest charged to the City on the amount due shall equal three times the discount rate on 90-day commercial paper, but shall not exceed 30 percent.

The City is also required to ensure that the contractor includes a clause in each subcontract that obligates the contractor to pay first-tier subcontractors for satisfactory performance under its contract. Contractors must pay subcontractors within ten (10) calendar days of receiving payment from the City. Contracts between primary contractors and subcontractors must also contain an interest penalty clause that obligates the contractor, if payment is not made to the subcontractor within thirty (30) calendar days after receipt of payment from the City, to pay the first-tier subcontractor an interest penalty on amounts due in the case of each payment not made in accordance with the subcontract payment clause. The contractor is also required to ensure that first-tier subcontractors include these requirements in each of its subcontracts with lower-tier subcontractors or suppliers.

If requested in writing by a first-tier subcontractor, within ten (10) calendar days after receiving the request, the contractor must provide the first-tier subcontractor, a copy of that portion of any invoice or request for payment submitted to the City, or pay document provided by the City to the contractor, specifically related to any labor or materials supplied by the first-tier subcontractor.

8. Bid Bond, Public Works Bond, Payment Bond and Performance Bond

A Bid Bond, Public Works Bond Filing Certification, Payment Bond and Performance Bond shall be provided. No waivers, special requirements or emergency provisions have been established for this Contract.

9. Conditions of Work

Bidders must make their own determination of the nature of the work proposed under this Contract, the existing and current conditions which can be encountered in this area, and all other matters which can in any way affect the work proposed under this Contract. It shall also be the bidder's responsibility to be thoroughly familiar with the Bidding Documents. Failure to make the examination necessary for this determination or to examine any form, instrument or document of the Contract shall not release the bidder from the obligations of this Contract.

10. Review of Bids; Basis for Award; Notice of Intent to Award; And Right To Protest Award

In reviewing all bids received and determining the lowest responsible bidder, the City reserves the right to take into account and give reasonable weight to the extent of the bidder's experience on work of the nature involved, on the bidder's record as to dependability in carrying out of contracts, and evidence of present ability to perform the Contract in a satisfactory manner.

The City may make such investigations as deemed necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish to the City all such information and data for this purpose as the City may request. The City reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the City that such bidder is properly qualified to carry out the obligations of the Contract, to complete the work contemplated therein, and to do so in a timely manner. The City specifically reserves the right to reject a bid from a bidder who, at the time bids are opened, has failed to complete work in a timely manner under a contract previously awarded to the bidder by the City. Conditional bids will not be accepted.

In accordance with ORS 279A.120(2)(b), in determining the lowest responsible bidder, the City shall, for the purpose of awarding the Contract, add a percentage increase on the bid of a non resident bidder equal to the percent, if any, of the preference given to that bidder in the state in which the bidder resides.

Within forty-five (45) calendar days after the bid opening, the City will accept one of the bids or reject all of the bids received. If the City intends to accept one of the bids, it shall issue a Notice of Intent to Award the Contract to all bidders. The City's award will not be final until seven (7) calendar days after the date of the notice if no protest is filed; or if a protest is filed, until the City provides a written response to all timely-filed protests that denies the protest and affirms the award.

A bidder may submit a formal written protest to the City's Notice of Intent to Award the Contract within seven (7) calendar days of the date of the City's Notice of Intent. The written protest must specify the grounds upon which the protest is based and must show that the protesting party is an adversely affected or aggrieved bidder. A bidder is adversely affected or aggrieved only if the bidder is eligible for award of the Contract as the responsible bidder submitting the lowest responsible bid, is next in line for award and claims that all lower bidders are ineligible for award in accordance with law.

Such protest must be submitted to the Douglas ESD, 1409 NE Diamond Lake Blvd., Suite 110, Roseburg, OR 97470. Any protest received after the 7-day deadline will not be considered. The City Superintendent who shall have the authority to settle or resolve the protest by written decision.

11. Commencement Date and Expiration Date of Contract

The bidder whose bid is accepted will be required to appear within ten (10) calendar days after notice that the Contract has been awarded to bidder and to execute the Contract with the City for the full and complete performance of all work specified, and as required by Subsection 5.4 of the General Conditions, deliver the Public Works Bond Filing Certification form, the Payment Bond to assure payment of the obligations incurred in the performance of the Contract and the Performance Bond and to ensure performance of the Contract.

Should the successful bidder fail or refuse to execute the Contract and furnish the Public Works Bond Filing Certification form, Payment Bond and/or Performance Bond when required, then the Bid Bond deposited by said bidder shall be retained by the City as liquidated damages.

12. Duration of Bids; Return of Bid Bonds

All bids will be binding until the later of:

- 1) the day the contract is executed; or
- 2) sixty (60) calendar days after the date of bid opening.

Bid bonds will be returned to unsuccessful bidders not later than the date on which the bids are no longer binding.

13. Public Records

These Contract Documents and each bid received in response to it, together with copies of documents pertaining to the award of a contract shall be kept on file as a public record by the City; provided however, such records shall not be disclosed until after the notice of intent to award the contract has been issued.

14. Records Review; Confidentiality

After notice of intent to award the resulting contract has been issued, all bids shall be available for public inspection except for those portions of a bid that the bidder designates in its bid as trade secrets or as confidential proprietary data in accordance with applicable state law. If the City determines such designation is not in accordance with applicable law, the City shall make those portions available for public inspection. The bidder shall separate information designated as confidential from other non-confidential information at the time of submitting its proposal. Prices, makes, models or catalog numbers of items offered, scheduled delivery dates and terms of payment are not confidential, and shall be publicly available regardless of a bidder's designation to the contrary.

END OF SECTION

SECTION 00 3100

AVAILABLE PROJECT INFORMATION

1. EXISTING CONDITIONS ASBESTOS SURVEY

- A. A copy of the Building Asbestos Survey for the existing buildings is available. Contact the Architect for viewing.

2. END OF SECTION

SECTION 00 4200

BID FORM

1. Project Information

Owner: CITY OF LOWELL
Name of Project: MAGGIE OSGOOD LIBRARY AND CITY HALL RENOVATION
Project Location: 70 N. Pioneer St., Lowell, OR 97452

2. Acknowledgements

This bid is submitted to Lowell City Hall at 107 E.3rd St., Lowell, OR 97452

The undersigned bidder proposes and agrees, if this bid is accepted, to enter into a Construction Agreement with the City in the form included in the contract documents and to complete all work as specified or indicated in the contract documents for the contract price and within the contract time indicated in this bid and in accordance with the contract documents.

Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation, those dealing with disposition of bid security. This bid may not be amended or withdrawn and is subject to acceptance for forty (45) days after the date of bid opening. The successful bidder will sign the Construction Agreement and submit the security and other documents required by the contract documents within ten (10) days after the date of City's Notice of Award.

In submitting this bid, bidder represents as more fully set forth in the Construction Agreement, that:

Bidder has examined copies of the contract documents and the following addenda:

Date: _____ Number: _____
Date: _____ Number: _____
Date: _____ Number: _____
Date: _____ Number: _____

Bidder has examined the site and locality where the Work is to be performed, the applicable legal requirements (federal, state, and local, ordinances, rules, and regulations) and the conditions affecting cost, progress, or performance of work, and has made such independent investigation as bidder deems necessary;

This bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm, or corporation, and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation; bidder has not directly or indirectly induced or solicited any other bidder to submit a false or sham bid; bidder has not solicited or induced any person, firm, or corporation to refrain from bidding; and bidder has not sought by collusion to obtain for himself any advantage over any other bidder or the City;

The City is not obligated to award any contract based on the bids submitted. Any award which the City makes will be on the basis of the lowest responsible bidder.

If the bidder is awarded the Contract for this work, the name and address of the Surety who will provide the Payment Bond, Performance Bond and Public Works Bond (if required) will be:

_____.

The following documents are attached to and made a condition to the bid (check all that are attached):

- Required bid security in the form of a bid bond or certified check in the amount of 10% of the bid;
- Non-Collusion Affidavit;
- First Tier Subcontractor Disclosure Form (attached to the bid or submitted to the City within two (2) hours after bid closing).
- Employee Drug Testing Program Certification Form.

The following documents are to be executed after the Contract is awarded, prior to beginning work of this project.

- Construction Contract
- Performance Bond and Payment Bond.
- Public Works Wage Certification Form.
- Certificate of Insurance.
- Public Works Bond Filing Certification.

3. Bid

Base Bid

Bidder will complete the entire Project for the following total price:

Base Bid: \$ _____

Bid Alternates (See Section 01 2300 - Alternates for additional Information)

Alternate No. 1 – Replacement Tile in Restrooms

Alt No. 1: \$ _____

Alternate No. 2 – New Fire Alarm System

Alt No. 2: \$ _____

Alternate No. 3 – Add Data Cabling

Alt No. 3: \$ _____

Alternate No. 4 – Add Casework Group B

Alt No. 4: \$ _____

Alternate No. 5 – Add Casework Group C

Alt No. 5: \$ _____

Alternate No. 6 – Add Casework Group D

Alt No. 6: \$ _____

4. Declarations

Bidder acknowledges the Project Milestone Dates in Specification Section 01 1000 - Summary.

Bidders Initials: _____

Bidder agrees and certifies as follows:

1. The provisions of ORS 279C.800 et seq., relating to the prevailing wage rates, will be complied with;
2. Declaration of Residency: I "am" or "am not" (circle one) a "resident bidder"* as defined by ORS 279A.120, a contractor that has paid unemployment taxes or income taxes in Oregon during the 12 calendar months immediately preceding submission of the bid, has a business address in this state and has stated in the bid whether the bidder is a "resident bidder" pursuant to ORS 279A.120.;
3. The provisions of ORS 305.385 relating to Oregon tax laws will be complied with;
4. Bidder has not and will not discriminate against minorities, women or emerging small business enterprises in obtaining any subcontracts required under this Contract, or against a business enterprise owner controlled by, or that employs, a disabled veteran as defined in ORS 408.225;
5. All employers, including bidder, that employ subject workers who work under the Construction Agreement shall comply with ORS 656.017 and provide the required Workers' Compensation coverage unless such employers are exempt under ORS
6. 656.126. Bidder shall ensure that each of its subcontractors complies with these requirements;
7. Bidder is registered and in good standing with the Construction Contractors Board in accordance with ORS 701.035 to 701.055;
8. All subcontractors performing work as described in ORS 701.005(2) will be registered with the Construction Contractors Board in accordance with ORS 701.035 to 701.055 before the subcontractors commence work under the contract.

Bidders Initials: _____

5. Authority to Submit Bid

Name of company submitting bid and name of authorized representative:

Bidder: Company Name: _____
Bidders CCB Number: _____
Bidder Tax ID Number: _____
Representative: _____
Address: _____
City, State, Zip: _____
Email Address: _____

If sole Proprietor or Partnership:

In witness hereto, the undersigned as set his/her hand this _____ day of _____, 2021.

Printed name of bidder: _____
Signature of bidder: _____
Title: _____

If Corporation:

In witness whereof, the undersigned corporation has caused this instrument to be executed and its seal affixed by its duly authorized officers this ____ day of _____, 2021.

Name of Corporation: _____
Printed name of person signing: _____
Signature: _____
Title: _____
Attest: _____
Secretary

END OF SECTION

SECTION 00 4313

BID BOND

We, _____, "as Principal,"
(Name of Principal)

and _____, an _____ Corporation,
(Name of Surety)

authorized to transact Surety business in Oregon, as "Surety," hereby jointly and severally bind ourselves, our respective heirs, executors, administrators, successors and assigns to pay unto the City of Roseburg ("Obligee") the sum of (\$_____)

_____ dollars.

WHEREAS, the condition of the obligation of this bond is that Principal has submitted its proposal or bid to an agency of the Obligee in response to Obligee's procurement document (No. _____) for the project identified as:

_____ which proposal or bid is made a part of this bond by reference, and Principal is required to furnish bid security in an amount equal to ten percent (10%) of the total amount of the bid pursuant to the procurement document and ORS 279C.365(5) for competitive bidding or 279C.400(5) for competitive proposals.

NOW, THEREFORE, if the proposal or bid submitted by Principal is accepted, and if a contract pursuant to the proposal or bid is awarded to Principal, and if Principal enters into and executes such contract within the time specified in the procurement document and executes and delivers to Obligee its good and sufficient performance bond, payment bond and public works bond as required by Obligee within the time fixed by Obligee, then this obligation shall be void; otherwise, it shall remain in full force and effect.

IN WITNESS WHEREOF, we have caused this instrument to be executed and sealed by our duly authorized legal representatives this ____ day of _____, 2021.

PRINCIPAL: _____ SURETY: _____

By _____ BY ATTORNEY-IN-FACT:
Signature

_____ Name
Official Capacity

Attest: _____ Signature
Corporation Secretary

_____ Address

_____ City State Zip

_____ Phone Email

END OF SECTION

SECTION 00 4338

FIRST-TIER SUBCONTRACTOR DISCLOSURE FORM

CITY OF LOWELL

MAGGIE OSGOOD LIBRARY AND CITY HALL RENOVATION

BID CLOSING Date: **March 31, 2022 at 2:00 pm.**

This form must be submitted at the location specified in the Invitation to Bid on the advertised bid closing date and within two working hours after the advertised bid closing time.

List below the name of each subcontractor that is required to be disclosed, the category of work that the subcontractor will be performing and the dollar value of the subcontract. Enter "NONE" if there are no subcontractors that need to be disclosed. (ATTACH ADDITIONAL SHEETS IF NEEDED.)

NAME	DOLLAR VALUE	CATEGORY OF WORK
1) _____	\$ _____	_____
2) _____	\$ _____	_____
3) _____	\$ _____	_____
4) _____	\$ _____	_____
5) _____	\$ _____	_____

FAILURE TO SUBMIT THIS FORM BY THE DISCLOSURE DEADLINE WILL RESULT IN A NON-RESPONSIVE BID. A NON-RESPONSIVE BID WILL NOT BE CONSIDERED FOR AWARD.

Form submitted by (bidder name): _____

Contact name: _____

Phone no.: _____

END OF SECTION

**SECTION 00 4519
NON-COLLUSION AFFIDAVIT**

State of _____) CITY O LOWELL

) ss.

County of _____) MAGGIE OSGOOD LIBRARY AND CITY HALL RENOVATIONS

I state that I am _____ of _____
and that I am authorized to make this affidavit on behalf of my firm, and its owners, directors, and officers. I am the person responsible in my firm for the price(s) and the amount of this bid.

I state that:

The price(s) and amount of this bid have been arrived at independently and without consultation, communication or agreement with any other contractor, bidder or potential bidder, except as disclosed on the attached appendix.

That neither the price(s) nor the amount of this bid, and neither the approximate price(s) nor approximate amount of this bid, have been discussed with any other contractor, bidder or potential bidder, except as disclosed on the attached appendix.

No attempt has been made or will be made to induce any firm or person to refrain from bidding on this contract, or to submit a bid higher than this bid, or to submit any intentionally high or noncompetitive bid or other form of complementary bid.

The bid of my firm is made in good faith and not pursuant to any agreement or discussion with, or inducement from, any firm or person to submit a complementary or other noncompetitive bid.

_____, its affiliates, subsidiaries, officers, directors and employees are not currently under investigation by any governmental agency and have not in the last four years been convicted of or found liable for any act prohibited by state or federal law in any jurisdiction, involving conspiracy or collusion with respect to bidding on any public contract, except as described on the attached appendix.

I state that I, _____ understands and acknowledges that the above representations are material and important, and will be relied on by the District in awarding the contract(s) for which this bid is submitted. I understand and my firm understands that any misstatement in this affidavit is and shall be treated as fraudulent concealment from the District of the true facts relating to the submission of bids for this contract.

Name of Company: _____

Position: _____

SIGNED and SWORN to before me this _____ day of _____, 201_, by _____.

Notary Public for _____

END OF SECTION

SECTION 00 4520

EMPLOYEE DRUG TESTING PROGRAM

CITY OF LOWELL

MAGGIE OSGOOD LIBRARY AND CITY HALL RENOVATION

ORS 279C.505 (2) provides that every public improvement contract contain a condition that the Contractor shall demonstrate that an employee drug testing program is in place. The Agency's award of the Contract for which this certificate is required is conditioned, in part, upon the Bidder's demonstration of compliance with the provisions of ORS 279C.505(2). If the Bidder named above is awarded the Contract, this certificate shall become a part of, and shall constitute a continuing representation and warranty under, the Contract.

To induce the Agency to award the Contract to the Bidder, the undersigned, as the duly authorized representative of the Bidder, hereby represents and warrants, on behalf of the above named Bidder:

1. That Bidder has and enforces, and at all times during the term of the Contract will have and enforce, a written employee drug testing policy that at a minimum, requires compliance with the Oregon Department of Transportation Commercial Drivers License drug testing regulations;
2. A copy of the Bidder's current written employee drug testing policy will be available for inspection by the Agency at any time upon the Agency's request; and
3. The Bidder understands and agrees that its representations and warranties herein will become a continuing part of the Contract and that breach of any of the foregoing will be sufficient grounds for disqualification under 279C.440(2)(d).

The Agency shall not be liable, either directly or indirectly, in any dispute arising out of the substance or procedure of Bidder/Contractor's drug testing program. Nothing in this drug testing provision shall be construed as requiring Bidder/Contractor to violate any legal, including constitutional rights of any employee, including but not limited to, selection of which employees to test and the manner of such testing. The Agency shall not be liable for Bidder/Contractor's negligence in establishing or implementing, or failure to establish or implement, a drug testing policy, or for any damage or injury caused by Bidder/Contractor's employees acting under the influence of drugs while performing work covered by the Contract. These are Bidder/Contractor's sole responsibilities.

In Witness whereof, the Bidder has caused this document to be executed by its duly authorized representative on the date shown below.

Signature: _____

Printed Name, Title: _____

Date: _____

END OF SECTION

SECTION 00 5000

CONTRACTING FORMS AND SUPPLEMENTS

1. GENERAL
 - A. The following AIA forms will be provided as needed.
 - B. The most recent version of the AIA Document will be utilized.
2. AGREEMENT AND CONDITIONS OF THE CONTRACT
 - A. See Section 00 5200 - Agreement Form for the Agreement form to be executed.
 - B. See Section 00 7200 - General Conditions for the General Conditions.
3. FORMS
 - A. The following AIA forms will be provided as needed.
 - B. Bond Forms:
 - B1. Bid Bond Form: Section 00 4313
 - B2. Performance Bond: Section 00 6112.
 - B3. Payment Bond Form: Section 00 6114.
 - C. Clarification and Modification Forms:
 - C1. Construction Change Directive Form: AIA G714.
 - C2. Change Order Form: AIA G701.
 - D. Closeout Forms:
 - D1. Contractor's Affidavit of Payment of Debts and Claims: AIA G706
 - D2. Affidavit of Payment of Debts and Claims: AIA G706
 - D3. Contractor's Affidavit of Release of Liens: AIA G706A
 - D4. Consent of Surety to Final Payment: AIA G707
 - D5. Consent of Surety to Reduction in or Partial Release of Retainage: G707A
4. REFERENCE STANDARDS
 - A1. AIA A201 - General Conditions of the Contract for Construction.
 - A2. AIA G701 - Change Order.
 - A3. AIA G702 - Application and Certificate for Payment.
 - A4. AIA G703 - Continuation Sheet.
 - A5. AIA G704 - Certificate of Substantial Completion.
 - A6. AIA G706 - Contractor's Affidavit of Payment of Debts and Claims.
 - A7. AIA G706A: Contractor's Affidavit of Release of Liens.
 - A8. AIA G707: Consent of Surety to Final Payment.
 - A9. AIA G707A: Consent of Surety to Reduction in or Partial Release of Retainage.
 - A10. AIA G714 - Construction Change Directive.

END OF SECTION

SECTION 00 5200

AGREEMENT

CITY OF LOWELL

MAGGIE OSGOOD LIBRARY AND CITY HALL RENOVATION

THIS AGREEMENT is made this _____ day of _____, 2022 , by and between the Douglas Education Service District, hereinafter called Owner, and

_____ hereinafter called Contractor, in consideration of mutual covenants hereinafter set forth, agree as follows:

1. **Work.** Contractor shall complete all work as specified in the contract documents and in accordance with the documents and drawings provided for the Project known as the Maggie Osgood Library and City Hall Renovation (Project).
2. **Materials.** Contractor will furnish all materials, supplies, tools, equipment, labor and other services necessary for the construction and completion of the Project described herein.
3. **Contract Time.** The Work will commence within ten (10) calendar days after the date of the Notice to Proceed and will achieve substantial completion no later than the date stipulated in Specification Section 01 1000 - Summary, unless the period for completion is extended otherwise by the contract documents or by written agreement of the parties. Other critical milestone dates are listed 01 1000 - Summary.
4. **Contract Price.** Owner shall pay Contractor for performance of the Work in accordance with the documents the sum of \$ _____ as shown in Contractor's bid.
5. **Progress Payments.** Owner shall make progress payments on the basis of the Contractor's application for payment as approved by the Owner's representative as provided herein. All progress payments shall be on the basis of progress of the Work measured by the schedule of values provided for in the General Conditions. Prior to substantial completion, progress payments will be an amount equal to not more than 95% of the Work completed and 95% of the materials and equipment not incorporated in the Work, but delivered and suitably stored, less in each case the aggregate of payments previously made. Upon substantial completion, the Owner shall pay an amount sufficient to increase total payments to Contractor to 95% of the contract price, less such amounts as the Owner shall determine in accordance with the General Conditions. Final payment shall be upon final completion and acceptance of the Work. Partial payment estimates shall be review and approved by Architect and forwarded to Owner for payment.
6. **Insurance.** Insurance coverage shall be provided in accordance with the General Conditions. Contractor shall maintain commercial general liability insurance, including personal injury liability, blanket contractual liability and broad form property damage liability with a minimum combined single limit for bodily injury and property damage of not be less than \$2,000,000. Contractor shall maintain statutory workers' compensation and employer's liability insurance as required by Oregon law.
7. **Contract Documents.** The term "contract documents" means and includes the following:
 - Invitation to Bid;
 - Instructions to Bidders;
 - Bid;
 - Bid Bond;
 - Construction Agreement;

- First-Tier Subcontractor Disclosure Form;
 - Oregon Prevailing Wage Rates;
 - General Conditions - AIA A201-2007 as modified
 - Payment Bond;
 - Performance Bond;
 - Notice of Intent to Award;
 - Notice to Proceed;
 - Drawings and Specifications attached;
 - Change Orders;
 - Addenda; Number: Dated:
 - Addenda; Number: Dated:
 - Addenda; Number: Dated:
 - Addenda; Number: Dated:
 - Proof of Insurance
8. Contractor's Representations. In order to induce Owner to enter into this agreement, Contractor makes the following representations:
- a. Contractor has familiarized itself with the nature and extent of the contract documents, work, locality, and with all local conditions and any federal, state, and local laws, ordinances, rules, and regulations which, in any manner, may affect cost, progress, or performance of the Work;
 - b. Contractor has studied carefully all reports, investigations, and tests of subsurface and latent physical conditions at the site which may affect cost, progress, or performance of work and which were relied upon in the preparation of the drawings and specifications;
 - c. Contractor has made or has caused to be made examinations, investigations, tests and studies of reports and related data, in addition to those referred to in paragraph (b), which Contractor deems necessary for the performance of the Work, determination of the contract price, and completion of the Project within the contract time in accordance with the other terms and conditions of the contract documents. No additional examinations, investigations, tests, reports, or similar data are or will be required by Contractor for such purposes;
 - d. Contractor has reconciled the results of all such observations, examinations, investigations, tests, reports, and data with the terms and conditions of the contract documents;
 - e. Contractor has given the Owner's representative written notice of all conflicts, errors or discrepancies which he has discovered in the contract documents and the written resolution thereof by the Owner's representative is acceptable to the Contractor.
9. Oregon Public Contracting Required Terms. Section 00 5201 of the Contract Documents contains terms that are required for public improvement contracts in the State of Oregon. As applicable to the Project, Section 00 5201 of the Contract Documents is incorporated herein and made applicable to the Project.
10. Performance Bond. For public improvement projects, Contractor shall provide a Performance Bond in a form acceptable to the City of Lowell. Each bond shall be equal to 100% of the Contract amount. The Performance Bond must be signed by the Surety's Attorney-in-fact, and the Surety's seal must be affixed to each bond. Bonds shall not be canceled without the City of Lowell's consent, nor will the City release them prior to Contract completion. Bonds must be originals – faxed or photocopied bond forms will not be accepted.

Payment for the bond premiums are the responsibility of the Contractor and are expected to be included in the Contractor's project bid. Any increase in bond premium due to a change order is also the responsibility of the Contractor and shall be reflected in the Contractor's quote for that change order.

11. Miscellaneous.

The Owner's representative is:

Jeremy Caudle
City Administrator
107 E. 3rd Street, Lowell, OR 97452

The Contractor's representative is:

No assignment by a party hereto of any rights under or interests in the contract documents will be binding on another party to this contract without the written consent of the parties sought to be bound; and specifically but without limitation, monies which may become due and monies which are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law) and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the contract documents.

This Agreement shall be binding upon all parties to the contract and their respective partners, successor, heirs, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

THIS AGREEMENT is effective on the _____ day of _____ 2021

OWNER:

CONTRACTOR:

By: _____

By: _____

Address for giving notices:

Address for giving notices:

ATTEST:

ATTEST:

Agent for Service of Process
License #

END OF SECTION

SECTION 00 5201

PUBLIC CONTRACTING CODE

CITY OF LOWELL

MAGGIE OSGOOD LIBRARY AND CITY HALL RENOVATION

1. Contractor shall pay promptly, as due, all persons supplying labor or materials for the prosecution of the work provided for in the contract, and shall be responsible for such payment of all persons supplying such labor or material to any Subcontractor.
 - a. ORS 279C.580(3)(a) requires the prime contractor to include a clause in each subcontract requiring contractor to pay the first-tier subcontractor for satisfactory performance under its subcontract within 10 days out of such amounts as are paid to the prime contractor by the public contracting agency; and
 - b. ORS 279C.580(3)(b) requires the prime contractor to include a clause in each subcontract requiring contractor to pay an interest penalty to the first-tier subcontractor if payment is not made within 30 days after receipt of payment from the public contracting agency.
 - c. ORS 279C.580(4) requires the prime contractor to include in every subcontract a requirement that the payment and interest penalty clauses required by ORS 279C.580(3)(a) and (b) be included in every contract between a subcontractor and a lower-tier subcontractor or supplier.
2. Contractor shall promptly pay all contributions or amounts due the Industrial Accident Fund from such Contractor or Subcontractor incurred in the performance of the contract, and shall be responsible that all sums due the State Unemployment Compensation Fund from Contractor or any Subcontractor in connection with the performance of the contract shall promptly be paid.
3. Contractor shall not permit any lien or claim to be filed or prosecuted against the Contracting Agency on account of any labor or material furnished and agrees to assume responsibility for satisfaction of any such lien so filed or prosecuted.
4. A notice of claim on contractor's payment bond shall be submitted only in accordance with ORS 279C.600 and 279C.605.
5. Contractor and any Subcontractor shall pay to the Department of Revenue all sums withheld from employees pursuant to ORS 316.167.
6. Contractor shall demonstrate to the Contracting Agency (Lane Fire Authority) that an employee drug-testing program is in place within 10 days of receiving a Notice of Award.
7. Pursuant to ORS 279C.515, if Contractor fails, neglects or refuses to make prompt payment of any claim for labor or materials furnished to the Contractor or a Subcontractor by any person in connection with the contract as such claim becomes due, the Contracting Agency may pay such claim to the persons furnishing the labor or material and charge the amount of payment against funds due or to become due Contractor by reason of the contract. The payment of a claim in the manner authorized hereby shall not relieve the Contractor or his surety from his or its obligation with respect to any unpaid claim. If the Contracting Agency is unable to determine the validity of any claim for labor or material furnished, the Contracting Agency may withhold from any current payment due Contractor an amount equal to said claim until its validity is determined and the claim, if valid, is paid.
8. Pursuant to ORS 279C.515, if the Contractor or a first-tier Subcontractor fails, neglects, or refuses to make payment to a person furnishing labor or materials in connection with the public contract for a

public improvement within 30 days after receipt of payment from the Contracting Agency or contractor, the contractor or first-tier subcontractor shall owe the person the amount due plus interest charges commencing at the end of the 10 day period that payment is due under ORS 279C.580(4) and ending upon final payment, unless payment is subject to a good faith dispute as defined in ORS 279C.580. The rate of interest charged to Contractor or first-tier

9. Subcontractor on the amount due shall equal three times the discount rate on 90-day commercial paper in effect at the Federal Reserve Bank in the Federal Reserve District that includes Oregon on the date that is 30 days after the date when payment was received from the public contracting agency or from the Contractor, but the rate of interest shall not exceed 30%. The amount of interest may not be waived.
10. As provided in ORS 279C.515, if the Contractor or a Subcontractor fails, neglects, or refuses to make payment to a person furnishing labor or materials in connection with the public contract, the person may file a complaint with the Construction Contractor's Board, unless payment is subject to a good faith dispute as defined in ORS 279C.580.
11. Pursuant to ORS 279C.530, Contractor shall promptly, as due, make payment to any person, co-partnership, association, or corporation, furnishing medical, surgical and hospital care or
12. other needed care and attention, incident to sickness or injury, to employees of such Contractor, of all sums which the Contractor agrees to pay for such services and all monies and sums which the Contractor collected or deducted from the wages of employees pursuant to any law, contract or agreement for the purpose of providing or paying for such service.
13. Contractor shall employ no person for more than 10 hours in any one day, or 40 hours in any one week, except in cases of necessity, emergency, or where public policy absolutely requires it, and in such cases, except in cases of contracts for personal services designated under ORS 279A.055, Contractor shall pay the employee at least time and one-half pay for all overtime in excess of eight (8) hours a day or forty (40) hours in any one week when the work is five (5) consecutive days, Monday through Friday; or for all overtime in excess of 10 hours a day or 40 hours in any one week when the work week is 4 consecutive days, Monday through Friday; and for all work performed on Saturday and on any legal holidays as specified in ORS 279C.540.
14. Pursuant to ORS 279C.540(2), the Contractor must give notice to employees who work on this contract in writing, either at the time of hire or before commencement of work on the contract, or by posting a notice in a location frequented by employees, of the number of hours per day and the days per week that the employees may be required to work.
15. The provisions of ORS 279C.800 to ORS 279C.870 relating to the prevailing wage rates will be complied with. The hourly rate of wage to be paid by Contractor or any Subcontractor to workers in each trade or occupation required for the public works employed in the performance of this Contract shall not be less than the specified minimum rate of wage in accordance with ORS 279C.838 and ORS 279C.840.
 - a. The latest prevailing wage rates for public works contracts in Oregon are contained in the following publications: The January 2018 Prevailing Wage Rates for Public Works Projects in Oregon. Such publications can be reviewed electronically at: <http://www.oregon.gov/boli/WHD/PWR/Pages/PWR-Rate-Publications---2018.aspx> and are hereby incorporated as part of the contract documents.
 - b. Contractor and all Subcontractors shall keep the prevailing wage rates for this Project
 - c. posted in a conspicuous and accessible place in or about the Project.

- d. The Owner shall pay a fee to the Commissioner of the Oregon Bureau of Labor and Industries as provided in ORS 279C.825. The fee shall be paid to the Commissioner as required by the administrative rules adopted by the Commissioner.
 - e. If Contractor or any Subcontractor also provides for or contributes to a health and welfare plan or a pension plan, or both, for its employees on the Project, it shall post notice describing such plans in a conspicuous and accessible place in or about the Project. The notice shall contain information on how and where to make claims and where to obtain future information.
16. Unless exempt under ORS 279C.836(4), (7), (8) or (9), before starting work on this contract, or any subcontract hereunder, contractor and all subcontractors must have on file with the Construction Contractors Board a public works bond with a corporate surety authorized to do business in the state of Oregon in the amount of \$30,000. The bond must provide that the contractor or subcontractor will pay claims ordered by the Bureau of Labor and Industries to
17. workers performing labor upon public works projects. The bond must be a continuing obligation, and the surety's liability for the aggregate of claims that may be payable from the bond may not exceed the penal sum of the bond. The bond must remain in effect continuously until depleted by claims paid under ORS 279C.836(2), unless the surety sooner cancels the bond. The surety may cancel the bond by giving 30 days' written notice to the contractor or subcontractor, to the board and to the Bureau of Labor and Industries. When the bond is canceled, the surety is relieved of further liability for work performed on contracts entered into after the cancellation. The cancellation does not limit the surety's liability for work performed on contracts entered into before the cancellation. Contractor further certifies that contractor will include in every subcontract or provision requiring a subcontractor to have a public works bond filed with the Construction Contractors Board before starting work on the project, unless exempt under ORS 279C.836(4), (7), (8), or (9).
- a. Unless exempt under ORS 279C.836(4), (7), (8), or (9), before permitting a subcontractor to start work on this public works project, the contractor shall verify that the subcontractor has filed a public works bond as required under this section or has elected not to file a public works bond under ORS 279C.836(7).
 - b. Unless public contracting agency has been notified of any applicable exemptions under ORS 279C.836(4), (7), (8), or (9), the public works bond requirement above is in addition to any other bond contractors or subcontractors may be required to obtain under this contract.
18. As may be required by ORS 279C.845, Contractor or contractor's surety and every subcontractor or subcontractor's surety shall file certified payroll statements with the Contracting Agency in writing.
- a. If a contractor is required to file certified statements under ORS 279C.845, the Contracting Agency shall retain 25% of any amount earned by the contractor on the public works project until the contractor has filed with the Contracting Agency statement as required by ORS 279C.845. The Contracting Agency shall pay the contractor the amount retained within 14 days after the contractor files the required certified statements, regardless of whether a subcontractor has failed to file certified statements required by statute. The Contracting Agency is not required to verify the truth of the contents of certified statements filed by the contractor under this section and ORS 279C.845.
 - b. The contractor shall retain 25% of any amount earned by a first-tier subcontractor on this public works contract until the subcontractor has filed with the Contracting Agency certified statements as required by ORS 279C.845. The contractor shall verify that the first-tier

subcontractor has filed the certified statements before the contractor may pay the subcontractor any amount retained. The contractor shall pay the first-tier subcontractor the amount retained within 14 days after the subcontractor files the certified statements as required by ORS 279C.845. Neither the Contracting Agency nor the contractor is required to verify the truth of the contents of certified statements filed by a first-tier subcontractor.

19. All employers, including Contractor, that employ subject workers who work under this contract shall comply with ORS 656.017 and provide the required Workers' Compensation coverage, unless such employers are exempt under ORS 656.126. Contractor shall ensure that each of its subcontractors complies with these requirements.
20. All sums due the State Unemployment Compensation Fund from the Contractor or any Subcontractor in connection with the performance of the contract shall be promptly so paid.
21. The contract may be canceled at the election of Contracting Agency for any willful failure on the part of Contractor to faithfully perform the contract according to its terms.
22. Contractor certifies that it has not discriminated against minorities, women or emerging small business enterprises or a business enterprise that is owned or controlled by or that employs a disabled veteran as defined in ORS 408.225 in obtaining any required subcontractors. ORS 279A.110.
23. Contractor certifies its compliance with the Oregon tax laws, in accordance with ORS 305.385.
24. In the performance of this contract, the Contractor shall use, to the maximum extent economically feasible, recycled paper, materials, and supplies, and shall compost or mulch yard waste material at an approved site, if feasible and cost effective.
25. As may be applicable, Contractor certifies that all subcontractors performing construction work under this contract will be registered with the Construction Contractors Board or licensed by the state Landscaping Contractors Board in accordance with ORS 701.035 to ORS 701.055 before the subcontractors commence work under this contract.
26. Pursuant to Contracting Agency Public Contracting Rule 137-049-0880, the Contracting Agency may, at reasonable times and places, have access to and an opportunity to inspect, examine, copy, and audit the records relating to the Contract.
27. In compliance with the provisions of ORS 279C.525, The Contractor and Subcontractor shall comply with all federal, state and local laws, rules, ordinances and regulations at all times and in the performance of the contract.

END OF SECTION

SECTION 00 6112
PERFORMANCE BONDS

KNOW ALL PERSONS BY THESE PRESENTS that

(Name of Contractor)

(Address of Contractor)

_____ hereinafter called
"PRINCIPAL", and (Corporation, Partnership, or Individual)

(Name of Surety)

(Address of Surety)

(Oregon representative for service of process for Surety)

hereinafter called "SURETY", are held and firmly bound unto

City of Lowell

107 E. 3rd Street

Lowell, OR 97452

hereinafter called "OWNER", in the total amount of:

_____ Dollars (\$ _____)
(insert here a sum for the equal to the contract price)

payment whereof PRINCIPAL and SURETY bind themselves, their heirs, executors, administrators, successors and assigns jointly and severally, firmly by these presents.

WHEREAS, the PRINCIPAL has by written agreement entered into a certain contract with the OWNER, dated the _____ day of _____, 20____, a copy of which is hereto attached and made a part hereof and is hereinafter referred to as the Contract. Said Contract is for:

NOW, THEREFORE:

1. The condition of this obligation is such that, if PRINCIPAL shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.
 - a. The SURETY hereby waives notice of any alteration or extension of time made by the OWNER.
2. It is expressly agreed that the Bond shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment of the Contract not increasing the Contract price more than twenty percent (20%), so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the Contract as so amended. The term "Amendment", wherever used in this Bond, and whether referring to this Bond, the Contract, or the Loan Documents shall include any alteration, addition, extension or modification of any character whatsoever.
3. Whenever PRINCIPAL shall be, and declared by OWNER to be in default under the Contract, the OWNER having performed OWNER's obligations thereunder, the SURETY may promptly remedy the default, or shall promptly:
 - a. Arrange for the PRINCIPAL, with consent of the OWNER, to perform and complete the contract;
 - b. Complete the Contract in accordance with its terms and conditions, or
 - c. Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by OWNER and the SURETY jointly of the lowest responsible bidder, arrange for a contract between such bidder and OWNER, and make available as work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the SURETY may be liable hereunder, the amount set forth above. The term "balance of the contract price," as used in this paragraph, shall mean the total amount payable by OWNER to PRINCIPAL under the Contract and any amendments thereto, less the amount properly paid by OWNER to PRINCIPAL.
4. Any suit under this Bond must be instituted before the expiration of two (2) years from the date on which final payment under the Contract falls due.
5. If any provision of this Bond conflicts with state law, such portion will be deemed deleted therefrom and provisions conforming to such state law shall be deemed incorporated herein. The intent is that the bond shall be construed as a statutory bond and not as a common law bond.
6. No right of action shall accrue on this Bond to or for the use of any person or corporation other than the OWNER named herein or the heirs, executors, administrators or successors of the OWNER.

IN WITNESS WHEREOF, this instrument is executed in _____ counterparts, each one of which shall be deemed an original, this the _____ day of _____, 20__ .

ATTEST:

PRINCIPAL

END OF SECTION

SECTION 00 6114

PAYMENT BONDS

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

Name: _____

Address: _____

City, State, Zip: _____

SURETY (Name and Address of Principal Place of Business):

Name: _____

Address: _____

City, State, Zip: _____

CONTRACT

Effective Date of Agreement: _____

Amount: _____

Description (Name and Location): _____

BOND

Bond Number: _____

Date: _____

Amount: _____

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

Contractor's Name and Corporate Seal (Seal)

Signature

Print Name

Title

Attest: _____

Signature

Title

SURETY

Contractor's Name and Corporate Seal (Seal)

Signature

Print Name

Title

Attest: _____

Signature

Title

1.01 AGREEMENT

- A. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.
- B. With respect to Owner, this obligation shall be null and void if Contractor:
 - 1. Promptly makes payment, directly or indirectly, for all sums due Claimants, and
 - 2. Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.
- C. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.
- D. Surety shall have no obligation to Claimants under this Bond until:
 - 1. Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the addresses described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.
 - 2. Claimants who do not have a direct contract with Contractor:
 - a. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and
 - b. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and
 - c. Not having been paid within the above 30 days, have sent a written notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.
- E. If a notice by a Claimant required by paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.
- F. Reserved.
- G. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.
- H. Amounts owed by Owner to Contractor under the Contract shall be used for the

performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.

- I. Surety shall not be liable to Owner, Claimants, or others for obligations of Contractor that are unrelated to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.
- J. Surety hereby waives notice of any change, including changes of time, to the Contract or to related subcontracts, purchase orders, and other obligations.
- K. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.
- L. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished shall be sufficient compliance as of the date received at the address shown on the signature page.
- M. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.
- N. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.
- O. Definitions
 - 1. Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.
 - 2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

3. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract, or to perform and complete or otherwise comply with the other terms thereof.

FOR INFORMATION ONLY:

Name:

Address:

Phone:

Surety Agency or Broker:

Owner's Representative (Engineer or other):

END OF SECTION

SECTION 00 6115

PUBLIC WORKS BOND

1. The Contractor and each subcontractor shall have a public works bond in the amount of \$30,000 before starting work, unless exempt under ORS 279C.836(4), (7), (8), or (9). The contractor is required to include in every subcontract a provision requiring the subcontractor to have a public works bond filed with the Construction Contractors Board before starting work on the project, unless an exempt under ORS 279C.836(4),(7),(8) or (9). Before permitting a subcontractor to start work on a public works project, the contractor shall verify that the subcontractor has filed a public works bond or has elected not to file such bond under ORS 279.836 (7) or (8) or is exempt under ORS 279C.836(4) or (9). The Contractor shall provide a certification to County that Contractor and all subcontractors have filed the public works bond, unless exempt under ORS 279C.836(4), (7), (8), or (9).
 - a. [Effective Jan 1, 2008 - Applies to business enterprises certified before, on or after January 1, 2008 and to contracts for projects first advertised, or if not advertised then entered into, on or after January 1, 2008]
2. This bond is in addition to any performance bond and payment bond requirements. The bond must meet all Bureau of Labor and Industries requirements and provide that the contractor and subcontractor will pay claims ordered by the Bureau of Labor and Industries to workers performing labor on public works projects.

END OF SECTION

SECTION 00 7200
GENERAL CONDITIONS

1. General Conditions applicable to this contract is AIA Document A201, General Conditions of The Contract for Construction, Current Edition.

END OF SECTION

SECTION 00 7317

INSURANCE COVERAGE REQUIREMENTS

- A. Contractor shall not commence any work until contractor obtains, at contractor's own expense, all required insurance as specified below. Such insurance must have the approval of the owner as to limits, form and amount. The types of insurance contractor is required to obtain or maintain for the full period of the contract will be as specified below.
- B. Commercial General Liability insurance covering personal injury, bodily injury and property damage with limits as specified below. The insurance shall also include:
 - 1. Coverage's
 - a. Explosion & collapse
 - b. Underground hazard
 - c. Products/completed operations
 - d. Contractual liability
 - e. Broad form property damage
 - f. Owners' & contractors' protective
 - 2. Limits
 - a. \$2 million per occurrence
 - 3. Form
 - a. All policies must be of the occurrence form with combined single limit for bodily injury and property damage. Any deviation from this must be reviewed by the risk manager. All claims-made forms must have the prior approval of risk manager. Submit a complete copy of claims-made policies and endorsements with the certificate of insurance
- C. Automobile liability insurance comprehensive form with limits as specified below. The coverage shall include owned, hired and non-owned automobiles.
 - 1. Limits
 - a. \$1 million per occurrence
- D. Additional insured clause the liability insurance coverages required for performance of this contract shall be endorsed to name the owner and its divisions, its commissioners, officers, agents and employees as additional insureds on any insurance policies required herein with respect to provider's activities being performed under the contract. The additional insureds must be named as an additional insured by endorsement, and the policy must be endorsed to show cancellation extensions to additional insureds. Coverage shall be primary and Non-contributory with any other insurance and self-insurance.
 - 1. Provide additional insured endorsement form cg 2010.
- E. Workers' compensation and employer's liability as statutorily required for persons performing work under this contract. Any subcontractor hired by contractor shall also carry workers' compensation and employers' liability coverage.
 - 1. Employer's Liability
 - a. Limits of \$500,000

- F. Builder's risk insurance special form - "all-risk" or equivalent policy form. Limits to be the value of the contract plus the value of subsequent contract modifications and costs of materials supplied or installed by others comprising the total value for the entire project at the site on a replacement cost basis without optional deductibles.

END OF SECTION

SECTION 00 7343

PREVAILING WAGE REQUIREMENTS FOR PUBLIC WORKS CONTRACTS

Prevailing Wage Rates are the minimum wages that must be paid to all workers employed in the construction, reconstruction, major renovation or painting of all public works, unless specifically exempted by state or federal law. Rather than including the entire State and/or Federal Prevailing Wage Rate publications in the bid specifications and contract, public entities may make reference to the specific prevailing wage rate publication where the prevailing wage rates are found or provide a link to the specific prevailing wage rate publication where the prevailing wage rates are found.

Oregon Bureau of Labor and Industries Prevailing Wage Rates applicable to the subject project/contract are available on BOLI's website at www.oregon.gov.boli. The prevailing wages to be applied throughout the duration of this project are those in effect for BOLI Prevailing Wage Rate Region 6, (Douglas County Oregon), upon the date the project is first advertised.

Federal Prevailing Wages Rates under the Davis Bacon Act (40 U.S.C. 3141 et seq.) may be found at www.wdol.gov. The prevailing wages to be applied throughout the duration of this project are those in effect for Federal Prevailing Wage Rates under the Davis Bacon Act (40 U.S.C. 3141 et seq.) at the time the initial specifications were first advertised for bid solicitations.

If the project is subject to both ORS 279C.800 to 279C.870 and to the Davis Bacon Act (40 U.S.C. 3414 et seq.), the contractor and every subcontractor shall pay the higher of the applicable state or federal prevailing rate of wage to all workers on the projects.

For specific information or questions regarding the Prevailing Wage Rate Law, you may log on to the above referenced websites or contact the nearest Oregon Bureau of Labor and Industries office listed below.

BOLI Office Locations

Eugene	1400 Executive Parkway, Eugene, OR 97401	541-686-7623
Medford	700 E. Main, Suite 105, Medford, OR 97504	541-776-6270
Portland	800 NE Oregon St., #32, Portland, OR 97232	503-731-4074
Salem	3865 Wolverine St. NE, Bldg. E-1, Salem, OR 97305	503-378-3292

THIS PROJECT IS SUBJECT TO THE OREGON BOLI PREVAILING WAGE RATES EFFECTIVE ON January 1st, 2022.

END OF SECTION

SECTION 01 1000

SUMMARY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Project Information
- B. Definitions and declarations
- C. Work by Owner
- D. Contract Date Milestones
- E. Work Limits
- F. Owner Occupancy
- G. Contractor's Use of Site
- H. Protection of existing elements

1.2 RELATED SECTIONS

- A. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures
- B. Section 01 3000 – Administrative Requirements: Misc project requirements.
- C. Section 01 5000 – Temporary Facilities and Controls: Dust control and barriers
- D. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.
- E. Section 01 7419 – Construction Waste Management and Disposal: Waste management requirements
- F. Section 02 4100 – Demolition: Demolition procedures and hazardous material declaration.
- G. Section 11 3013 – Residential Appliances: OFOI appliances to provide power connections for.

1.3 PROJECT INFORMATION

- A. Project Name: Maggie Osgood Library and City Hall Renovation
- B. Owner's Name: City of Lowell
- C. Architect's Name: Wilson Architecture
- D. The project is located at a former church building location at 70 N. Pioneer Street in Lowell, OR. The existing building is approximately 2,880 square feet of wood framed construction.

The Project consists of renovations to the existing building to accommodate a new library and city hall spaces within the existing building. The work includes some demolition to existing walls, finishes, and ceilings, and new walls, doors, finishes, ceiling, etc to create the new spaces. Work at the building envelope is limited to accommodation of new doors and windows at the walls, and new plumbing vents and tubular skylights at the roof. The site improvements are limited to modifications at an isolated locations to the sidewalk and new pavement markings and signage for accessible parking. MEP improvements include removal

of some existing plumbing fixtures and associated work, replacement of existing ductwork with new ductwork, and modifications to the existing light, power, and data systems.

1.4 ADMINISTRATIVE REQUIREMENTS – See Section 01 3000 – Administrative Requirements

1.5 DEFINITIONS AND DECLARATIONS

- A. Provide: Furnish and install, complete with all necessary accessories, ready for intended use. Pay for all related costs.
- B. Approved: Acceptance of item submitted for approval. Not a limitation or release for compliance with the Contract Documents or regulatory requirements. Refer to limitations of 'Approved' in General and Supplementary Conditions.
- C. Match Existing: Match existing as acceptable to the Owner.
- D. Intent: Drawings and specifications are intended to provide the basis for proper completion of the work suitable for the intended use of the Owner. Anything not expressly set forth but which is reasonable implied or necessary for proper performance of the project shall be included.
- E. Writing Style: Specifications are written in the imperative mode. Except where specifically intended otherwise, the subject of all imperative statements is the Contractor. For example, 'Provide tile' means 'Contractor shall provide tile.'

1.6 WORK BY OWNER

- A. Items noted **OFOI** (Owner-Furnished, Owner-Installed) will be supplied and installed by Owner before Substantial Completion. Some items include:
 - 1. Furniture
 - 2. Residential Appliances
 - 3. Building data network rack, components, and connections at ends of cables installed by the Contractor.
 - 4. Building Intrusion Security System
 - 5. Toilet and Shower Accessories
 - a. Wall-mounted Soap Dispenser
 - b. Wall-mounted Paper Towel Dispenser
- B. Items noted **OFCI** (Owner-Furnished, Contractor-Installed) will be supplied by the Owner to the Contractor for installation before Substantial Completion. Contractor is responsible coordinated schedule with owner. Some items include:
 - 1. None
- C. Related Projects, Packages, or Contracts
 - 1. None

1.7 CONTRACT DATE MILESTONES

- A. Anticipated Notice to Proceed: 4/21/2022.
- B. Substantial Completion: 12/15/2022.

1.8 WORK LIMITS

- A. The Contractor has the use of the site within the existing fence within 80 ft of the building, except the storage building east of the main building.
- B. Contractor to limit their use of site within the work limits, without prior approval from the Owner.
- C. The work area of the buildings is described in the Drawings, however specific work limits are not delineated. The Contractor can use the building area adjacent to the work area for staging and storage.
- D. Coordinate extent of use with the Owner at the pre-construction meeting.

1.9 OWNER OCCUPANCY

- A. Owner intends to occupy the Project upon Substantial Completion.
- B. The Owner will discontinue operations of their facility within the Contractor's work limits, expect periodic access to the storage building. Allow the owner to access the storage building at all times.
- C. The Owner may use the southern portion of the site beyond 80 ft from the building for undetermined activities. Do not use that area for storage, staging, nor crew parking. Allow the Owner access to that portion of the site at all times.
- D. Cooperate with Owner to minimize conflict and to facilitate Owner's operations. Schedule the Work to accommodate Owner occupancy.

1.10 CONTRACTOR USE OF SITE AND PREMISES

- A. Except as otherwise stipulated herein, Contractors will have use of the Premises within the boundaries of the work limits for the execution of the Work, except as noted in this Section and where elsewhere noted in the Contract Documents.
- B. The Contractor is expected to use the building as a "Secured Work Area". At the Contractor's discretion, a perimeter security fence maybe installed to separate the Contractor's work area from the portions of the site the owner may use. When the work area is an unsecured work area, the Contractor shall:
 - 1. Secure tools and building materials when work area is vacated.
 - 2. Take down and/or secure ladders and scaffolding when an unsecured work area is vacated.
 - 3. Open holes and other tripping hazards shall be fenced or barricaded when an unsecured work area is vacated.
 - 4. Operations resulting in vapors, emissions or flying objects shall be conducted in such a way as to prevent exposure to any unprotected parties or property.

1.11 PRODUCTS ORDERED IN ADVANCE

- A. Products Ordered in Advance: None

1.12 PROTECTING EXISTING ELEMENTS

- A. Utilities

1. Site survey Drawings indicate approximate location of any known, concealed Utility Lines, including but not limited to ducts, pipes, cables, and wires. Before starting work, Contractor shall determine exact location of any of these Lines that could be damaged by contract work.
 2. Contractor shall assume that other unknown Utility Lines do exist, and Contractor shall proceed with caution when working in areas that could conceal unknown Utilities.
 3. If such Utility Lines are encountered, immediately request disposition instructions from Architect.
- B. Landscaping & Trees
1. Protect existing trees, not designated for removal, against damage caused by work of this contract.
 2. Provide necessary fencing and barricades. Erect prior to Work, and unless otherwise instructed, remove after Work completion. For any work around trees in the Right of Way (ROW), obtain approval from the Authority Having Jurisdiction (AHJ).
 3. Prohibit earth stockpiling, material storage, and vehicle parking and traffic within dripline of trees.
 4. Repair or replace with plants of equal size, any material damaged by Construction Operations.
- C. Subgrade
1. Contractor shall protect against damage, existing subgrade and earthwork provided under this Contract.
 2. Where necessary to accomplish required protection, provide additional temporary fill or other approved cover over Work to be protected.
- D. Structures
1. Contractor shall protect against damage, existing building parts not scheduled for repair or remodel under this contract.
 2. Where necessary to accomplish required protection, provide additional Temporary barricades, cushioning, or other approved Cover over material to be protected.

PART 2 PRODUCTS – Not Used

PART 3 EXECUTION – Not Used

END OF SECTION

SECTION 01 2300

ALTERNATES

PART 1 GENERAL

1.1 SECTION INCLUDES

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

1.2 RELATED REQUIREMENTS

- A. Document 00 2113 - Instructions to Bidders: Instructions for preparation of pricing for Alternates.
- B. Document 00 4200 - Bid Form: List of Alternates.
- C. Document 00 5200 - Agreement Form: Incorporating monetary value of accepted Alternates.

1.3 SUBMISSION REQUIREMENTS

- A. Submit Alternates as requested on Bid Form.
- B. Indicate variation of Bid Price for Alternates described below. The Bid Form requests a "difference" in Bid Price by adding to or deducting from the Base Bid Price.

1.4 ACCEPTANCE OF ALTERNATES

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.
- B. The Owner reserves the right to accept any combinations of alternates plus the base bid.
- C. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.
- D. Bids will be evaluated on the Base Bid price plus any or all of the Alternates intended to be exercised by the Owner. The order of the Alternates listed here does not represent the order in which any of these Alternates will be exercised.

1.5 SCHEDULE OF ALTERNATES

- A. Alternate No. 1 – Replace Tile in Restrooms.
 - 1. Under the Base Bid:
 - a. Existing wall and floor tile in the restrooms to remain.
 - b. New tile will be installed at voids created by removal of plumbing fixtures and toilet partitions.
 - 2. Under the Alternate:
 - a. Remove all existing wall and floor tile in the restrooms.
 - b. Provide new wall and floor tile per the Drawings noted as "ALTERNATE TILE LAYOUT".
 - 3. Alternate Type: Additive.

- B. Alternate No. 2 – New Fire Alarm System.
 - 1. Under the Base Bid:
 - a. No work in base bid related to the fire alarm system.
 - 2. Under the Alternate:
 - a. Provide a fire alarm system as described in the documents.
 - 3. Alternate Type: Additive.
- C. Alternate No. 3 - Add Data Cabling.
 - 1. Under the Base Bid:
 - a. Provide and install junction boxes and raceways for data system per the Drawings.
 - 2. Under the Alternate:
 - a. Provide and install data cabling per the Documents.
 - 3. Alternate Type: Additive.
- D. Alternate No. 4 - Add Casework Group B.
 - 1. Under the Base Bid:
 - a. Provide and install casework identified as Casework Group A.
 - 2. Under the Alternate:
 - a. Provide and install casework identified as Casework Group B.
 - 3. Alternate Type: Additive.
- E. Alternate No. 5 - Add Casework Group C.
 - 1. Under the Base Bid:
 - a. Provide and install casework identified as Casework Group A.
 - 2. Under the Alternate:
 - a. Provide and install casework identified as Casework Group C.
 - 3. Alternate Type: Additive.
- F. Alternate No. 6 - Add Casework Group D.
 - 1. Under the Base Bid:
 - a. Provide and install casework identified as Casework Group A.
 - 2. Under the Alternate:
 - a. Provide and install casework identified as Casework Group D.
 - 3. Alternate Type: Additive.

PART 2 PRODUCTS – Not Used

PART 3 EXECUTION – Not Used

END OF SECTION

SECTION 01 3000
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Coordination
- B. Permits and Fees
- C. Construction organization & start-up
- D. Submittals for review, information, and project closeout
- E. Project meeting

1.2 RELATED REQUIREMENTS

- A. Document 00 7200 - General Conditions: Dates for applications for payment.
- B. Section 01 3216 - Construction Progress Schedule: Form, content, and administration of schedules.
- C. Section 01 7000 - Execution and Closeout Requirements: Additional coordination requirements, including closeout procedures.
- D. Section 01 7800 - Closeout Submittals: Project record documents.

1.3 COORDINATION

- A. The Contractor is responsible for overall coordination of the Project.
- B. The Drawings and Specifications are arranged for convenience only and do not necessarily determine which trades perform the various portions of the Work.
- C. Coordinate sequence of work to accommodate agreed-upon Owner occupancy.
- D. Perform all necessary work to receive and/or join the work of all trades.
- E. Utilities
 - 1. Verify location of existing utilities and protect from damage.
 - 2. Notify affected utility companies and comply with their requirements.
 - 3. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- F. Prepare coordination drawings for areas above ceilings where close tolerances are required between building elements and mechanical and electrical work.
- G. Coordinate completion and clean-up of work of separate sections.
- H. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

- I. Dimensions: Verify dimensions indicated on drawings with field dimensions before fabrication or ordering of materials. Do not scale drawings.
- J. Existing Conditions: Notify Architect of existing conditions differing from those indicated on the drawings. Do not remove or alter structural components without prior written approval.
- K. Coordinating Subcontractors' Work
 - 1. 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.
 - 2. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
 - 3. Direct Subcontractors to correct defects in substrates they install when Subcontractors of subsequent materials have a reasonable and justifiable objection to such surfaces.
 - 4. Do not force Subcontractors to apply or install products to improperly placed or improperly finished substrates that would result in an unsatisfactory or unacceptable finished Product.
 - 5. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- L. Coordinating Work of Owner or other contracts
 - 1. See Section 01 1000 – Summary for Work by Owner.
 - 2. 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 Work following.
 - 3. If the Owner's Work in any way interferes with the Contractor's Work, so notify the Owner sufficiently in advance so that the Owner has reasonable time to make necessary adjustments.
 - 4. If the Contractor's Work in any way interferes with Owner's Work, so notify the Owner as soon as possible. If the Contractor's Work must be modified to accommodate the Owner's Work, except as described elsewhere in this Specification, the Contract Sum and/or the Contract Time will, when necessary be adjusted by a Change Order.

1.4 PERMITS AND FEES

- A. The Owner will be responsible for filing and paying for building permits and all fees associated with the building permit, system development charges, impact fees, etc. The Contractor will be responsible for picking up all Project permits and will have full responsibility for requirements of and payments for all trade permits (i.e. electrical, plumbing, mechanical).

1.5 CONSTRUCTION ORGANIZATION & START-UP

- A. Responsible Parties:

1. Immediately following Contract execution, Owner will and Contractor shall identify who, within their respective organizations, will be responsible for Project Coordination.
- B. The Contractor shall establish on-site Lines of Authority and Communications including the following:
 1. Schedule attendance at Preconstruction Meeting and schedule and conduct Progress Meetings.
 2. Establish procedures for Intra-project Communications including:
 - a. Submittals.
 - b. Reports & Records.
 - c. Recommendations.
 - d. Coordination Drawings.
 - e. Schedules.
 - f. Resolution of Conflicts.
 3. Technical 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.
 4. Permits & Approvals:
 - a. Verify that Subcontractors have obtained required Permits and Inspections for Work and for Temporary Facilities.
 5. Control use of Site:
 - a. Supervise Field Engineering and Project Layout.
 - b. Allocate sufficient field office space and work and storage areas to implement the project.

1.6 CONSTRUCTION PROGRESS SCHEDULE - See Section 01 3216

1.7 SUBMITTALS

- A. Submittals For Review
 1. When the following are specified in individual sections, submit them for review:
 - a. Product data.
 - b. Shop drawings.
 - c. Samples for selection and/or verification.
 - d. Other information required in individual specification sections.
 2. 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.
 3. Product Data:
 - a. Clearly mark each copy to identify pertinent Products.

- b. Show performance characteristics and capacities.
 - c. Show dimensions, field dimensions, and required clearances.
 - d. Show wiring and piping diagrams, and controls.
 - e. Show standard schematic drawings and diagrams as need to confirm extent of scope of work and application of product.
4. Samples will be reviewed only for aesthetic, color, or finish selection.
 5. 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.
- B. Submittals for Information
1. When the following are specified in individual sections, submit them for information:
 - a. Design data.
 - b. Certificates.
 - c. Test reports.
 - d. Inspection reports.
 - e. Manufacturer's instructions.
 - f. Manufacturer's field reports.
 - g. Other information required in individual specification sections.
 - h. Other types indicated.
 2. Submit for Architect's knowledge as contract administrator or for Owner. No action will be taken.
- C. Submittals for Project Closeout
1. When the following are specified in individual sections, submit them at project closeout:
 - a. Project record documents.
 - b. Operation and maintenance data.
 - c. Warranties.
 - d. Bonds.
 - e. Other information required in individual specification sections.
 - f. Other types as indicated.
 2. Submit for Owner's benefit during and after project completion.
- D. Number of Copies
1. Electronic 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.
 2. Samples: Submit the number specified in individual specification sections; two of which will be retained by Architect.

- a. After review, produce duplicates.
 - b. Retained samples will not be returned to Contractor unless specifically so stated.
 - c. Show full range of color, texture & pattern.
- E. Submittal Procedures
1. Shop Drawing Procedures:
 - a. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
 - b. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.
 2. Transmit each submittal with an agreed upon transmittal or cover form that clearly describes submittal contents and the quantity of items delivered. Transmittal of cover form to include:
 - a. Sequentially number the transmittal form to align with project manual submittal numbers and sequence of submittals in a manner agreeable to the Owner.
 - b. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.
 - c. 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.
 - d. When applicable, any deviations in Submittals from Contract Document requirements.
 - e. Provide space for Contractor and Architect review stamps.
 - f. When revised for resubmission, identify all changes made since previous submission.
 3. Deliver submittals digitally in a system agreeable to the Owner and Architect.
 4. Submittal schedule
 - a. Schedule submittals to expedite the Project, and coordinate submission of related items.
 - b. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
 - c. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
 5. Submit Shop Drawings, Product Data, and Samples only for those Items specifically required. The Architect will not be obligated to review Shop Drawings, Product Data, or Samples other than those required by the Contract Documents.
 6. Submittals not requested will not be recognized or processed.
 7. Perform no Work or Fabrication requiring Submittal until Architect approves Submittal.

PART 2 PRODUCTS – Not Used

PART 3 EXECUTION

3.1 PRECONSTRUCTION MEETING

- A. Owner will schedule a meeting after Notice of Award.
- B. Attendance Required:
 - 1. Owner.
 - 2. Architect.
 - 3. Contractor.
 - 4. Contractor's Superintendent.
 - 5. Major Subcontractors .
- C. Agenda:
 - 1. Introductions.
 - 2. Status Owner-Contractor Agreement.
 - 3. Status of post-bid submittals, including list of Subcontractors, list of Products, schedule of values, and progress schedule.
 - 4. Description of Project
 - 5. Distribution of Contract Documents.
 - 6. Designation of personnel representing the parties to Contract, Owner and Architect.
 - 7. Communication procedures, including field decisions
 - 8. Submittal procedures, including substitutions
 - 9. Payments procedures
 - 10. Change management and approval procedure
 - 11. Review of Contractor's scheduling, including key milestones
 - 12. Building permit status.
 - 13. Prevailing wage requirements.
 - 14. Hazardous materials
 - 15. Construction activities, working hours, use of site and building.
 - 16. Waste management procedures, daily clean up and staging and parking areas.
 - 17. Safety and Emergency Procedures.
 - 18. Record drawings and Operations and Maintenance Manuals
 - 19. Schedule of weekly on-site progress meetings.
- D. Architect will record meeting summary and distribute digital copies to Owner, their sub-consultants and Contractor.

3.2 PROGRESS MEETINGS

- A. Contractor shall schedule, host on site at appropriate setting, and administer meetings throughout progress of the Work at maximum weekly intervals.
- B. Attendance Required:
 - 1. Contractor.
 - 2. Owner.
 - 3. Architect.
 - 4. Contractor's Superintendent.
- C. Agenda:
 - 1. Review summary of previous meetings
 - 2. Review of recently completed Work
 - 3. Review of current Work
 - 4. Review of schedule and upcoming Work
 - 5. Identify Work that is at risk of proceeding per schedule and remedies to stay on schedule.
 - 6. Review status of:
 - a. Required testing
 - b. Permit issues
 - 7. Submittals Procedure, including
 - a. Recently returned submittals
 - b. Submittals in review
 - c. Submittals with highest priority
 - d. Upcoming submittals
 - 8. Contract modifications
 - 9. Open and/or unresolved construction issues
 - 10. New items
 - 11. Items to discuss prior to review of site conditions
- D. Architect shall record minutes and distribute copies within five days after meeting to participants, with digital copies to Architect, Owner, participants, and those affected by decisions made.

3.3 PRE-INSTALLATION CONFERENCES

- A. When required in individual specification sections, the Contractor shall convene a pre-installation meeting prior to commencing work of that section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Architect minimum seven days in advance of meeting date.
- D. The Contractor shall be responsible to prepare agenda and preside at meeting:

1. Review conditions of installation, preparation and installation procedures.
 2. Review coordination with related work.
- E. The Contractor shall be responsible to record minutes and distribute copies within four days after meeting to participants, with copies to Architect, Owner's Project Manager, participants, and those affected by decisions made.

END OF SECTION

SECTION 01 3216
CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Contractor's construction schedule
- B. Construction progress schedule, three weeks look ahead

1.2 RELATED REQUIREMENTS

- A. Section 01 2000 – Price and Payment Procedures: Pay application process
- B. Section 01 3000 – Administrative Requirements: Submittals and meetings

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- D. Event: The starting or ending point of an activity.
- E. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.4 COORDINATION

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

1.5 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice of Award to date of final completion.

- B. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule and show how the sequence of the Work is affected.
 - 1. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
- C. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.

1.6 THREE WEEK LOOK AHEAD SCHEDULE

- A. Each week during construction, provide companion schedule to master project schedule to look ahead three weeks. Provide increased detail as requested by the Owner or Architect to clearly show the work planned for the upcoming weeks.
- B. Distribute at the beginning of each weekly project meeting.

PART 2 PRODUCTS – Not Used

PART 3 EXECUTION – Not Used

END OF SECTION

SECTION 01 4000
QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Submittals
- B. References and standards
- C. Testing and inspection agencies and services
- D. Control of installation
- E. Mock-ups
- F. Tolerances
- G. Manufacturers' field services
- H. Defect Assessment

1.2 RELATED REQUIREMENTS

- A. Document 00 7200 - General Conditions: Inspections and approvals required by public authorities.
- B. Section 01 3000 - Administrative Requirements: Submittal procedures.
- C. Section 01 6000 - Product Requirements: Requirements for material and product quality.

1.3 REFERENCE STANDARDS

- A. ASTM C1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants; 2008 (Reapproved 2014).
- B. ASTM C1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation; 2014.
- C. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2015ae1.
- D. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2012a.
- E. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection and/or Testing; 2014a.
- F. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2015.
- G. OSSC - Oregon Structural Specialty Code, current edition.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Design Data:
 - 1. Submit for Architect's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.

C. Certificates:

1. 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.
2. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
3. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.

D. Manufacturer's Instructions:

1. 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:

1. Submit reports for Architect's benefit as contract administrator or for Owner.
2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.5 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.
- C. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.6 TESTING AND INSPECTION AGENCIES AND SERVICES

- A. Owner will employ and pay for services of an independent testing agency to perform other specified testing.
- B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

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. Before installing portions of the Work where mock-ups are required, construct mock-ups in location and size indicated for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship.
- B. Accepted mock-ups establish the standard of quality the Architect will use to judge the Work.
- C. Notify Architect fifteen (15) working days in advance of dates and times when mockups will be constructed.
- D. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Architect.

1.1 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

1.2 TESTING AND INSPECTION

- A. See individual specification sections and the current building code 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 all tests/inspections specified.
- C. Limits on Testing/Inspection Agency Authority:
1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 2. Agency may not approve or accept any portion of the Work.
 3. Agency may not assume any duties of Contractor.
 4. Agency has no authority to stop the Work.
- D. Contractor Responsibilities:
1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 2. Cooperate with laboratory personnel and provide access to the Work and to manufacturers' facilities.
 3. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
 - c. To facilitate tests/inspections.
 - d. To provide storage and curing of test samples.
 4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- E. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect.
- F. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor. Payment for re testing will be charged to the Contractor by deducting testing charges from the Contract Price.
- 1.3 DEFECT ASSESSMENT
- A. Replace Work or portions of the Work not conforming to specified requirements.

END OF SECTION

SECTION 01 5000
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Utilities and infrastructure
- B. Barriers and protection
- C. Construction facilities
- D. Removal of temporary facilities

1.2 RELATED REQUIREMENTS

- A. Section 01 1000 – Summary: Use of site
- B. Section 01 3000 – Administrative Requirements: Construction organization and start up
- C. Section 01 7419 – Construction Waste Management and Disposal: Waste management requirements

1.3 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

1.4 UTILITIES AND INFRASTRUCTURE

- A. Telecommunications Services
 - 1. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
 - 2. Telecommunications services shall include:
 - a. Windows-based personal computer dedicated to project telecommunications, with necessary software and laser printer.
 - b. Cell phone service with voice mail for the project superintendent is an acceptable alternative to a fixed telephone device for this project.
 - c. Internet Connections: Minimum of one; DSL modem or faster.
 - d. Email: Account/address reserved for project use.
- B. Temporary Power
 - 1. Contractor may use existing power in the building.
 - 2. Owner will pay utility bill during construction.
 - 3. Contractor to incorporate and maintenance energy efficiency procedures in place to use the resource appropriately.
- C. Temporary Water
 - 1. Contractor may use existing water in the building, but not existing fixtures.
 - 2. Owner will pay utility bill during construction.

3. Contractor to incorporate and maintenance energy efficiency procedures in place to use the resource appropriately.

D. Temporary Sanitary Facilities

1. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
2. Maintain daily in clean and sanitary condition.

1.5 BARRIERS AND PROTECTION

A. Security

1. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

B. Safety

1. Visitor Personal Protection Equipment
 - a. Provide four sets of Personal Protection Equipment (PPE) for use by official visitors to the project site during construction. Visitor PPE shall include as a minimum, hard hat and protective eye goggles. Provide high visibility garments when moving vehicles are in use on the construction site. Store in Field Office and reserve for use by visitors to the project site.
 - b. Maintain in good condition through the course of the project and replace equipment that does not meet personal safety requirements.

2. Fire Protection

- a. Provide and maintain necessary facilities and equipment to safeguard Project against Fire Damage.

C. Project Work Area Protection

1. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

2. Fencing

- a. Contractor's choice.

3. Traffic Controls: Provide as required to maintain safe working environment for Owner and Contractor personnel using the site.

D. Exterior Enclosures

1. Provide temporary insulated weather tight 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.
2. Provide access doors with self-closing hardware and locks.

1.6 CONSTRUCTION FACILITIES

A. Project Identification

1. A project sign is not required for this project.
2. No other signs are allowed without Owner permission except those required by law.

B. Field Office

1. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture and storage space for drawings and all project documents.
 - a. The Contractor may use the building as their office with the understanding that clean, safe space with acoustical control appropriate for a meeting will be provided.
2. Provide space for project meetings, with table and chairs to accommodate 6 persons.

C. Staging

1. Maintain within Project Limits in accordance with Architect's and Owner's instructions. Do not block exit ways or overload structure.

D. Vehicle Access and Parking

1. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
2. Coordinate access and haul routes with governing authorities and Owner.
3. Provide and maintain access to fire hydrants, free of obstructions.
4. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.
5. Do not use Owner's parking Lots for overnight vehicle storage, equipment storage, nor crew parking without prior approval from the Owner.
6. Repair existing facilities damaged by use, to condition at the start of construction.
7. Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.

1.7 WASTE MANAGEMENT – See Section 01 7419 – Construction Waste Management and Disposal

1.8 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

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

PART 2 PRODUCTS – Not Used

PART 3 EXECUTION – Not Used

END OF SECTION

SECTION 01 6000
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Substitution limitations and procedures.
- B. General product requirements.
- C. Re-use of existing products.
- D. Procedures for Owner-supplied products.
- E. Transportation, handling, storage and protection.

1.2 RELATED REQUIREMENTS

- A. Document 00 2113 - Instructions to Bidders: Product options and substitution procedures prior to bid date.
- B. Section 01 4000 - Quality Requirements: Product quality monitoring.
- C. Section 01 6023 - Substitution Request Form
- D. Section 01 7419 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting packaging and substitutions.

1.3 SUBMITTALS

- A. Proposed Products List
 - 1. Submit list of major products that comply with the specifications and are proposed for use, with name of manufacturer, trade name, and model number of each product.
 - 2. Submit within 15 days after date of Subcontract Award Notice.
 - 3. For products specified only by reference standards, list applicable reference standards.
- B. Product Data Submittals
 - 1. 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.
- C. Shop Drawing Submittals
 - 1. 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.
- D. Sample Submittals
 - 1. Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 2. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

1.4 SUBSTITUTION REQUEST PROCEDURES – PROCUREMENT PERIOD

A. Considerations

1. Substitutions will be considered when:
 - a. It benefits the Owner.
 - b. A product, through no fault of the Contractor, becomes unavailable or unsuitable due to regulatory change.

B. Process

1. Instructions to Bidders specifies process and time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in that section.

C. Format

1. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
2. Each request for substitution approval shall include:
 - a. Identity of Product for which substitution is requested; include Specification Section.
 - b. Identity of substitution; include complete Product description, drawings, photographs, performance and test data, and any other information necessary for evaluation.
 - c. Quality comparison of proposed substitution with specified product.
 - d. Changes in other Work required because of substitution.
 - e. Effect on construction progress schedule.
 - f. Cost of proposed substitution compared with specified product.
 - g. Availability of maintenance service.
 - h. Source of replacement materials.

D. Declaration

1. A request for substitution constitutes a representation that the submitter:
 - a. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
 - b. Agrees to provide the same warranty for the substitution as for the specified product.
 - c. Agrees to coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
 - d. Waives claims for additional costs or time extension that may subsequently become apparent.

E. Criteria and Evaluation

1. The evaluation will be based on the suitability of the proposed product to meet the intent of the specified product based on submitted documentation.
2. Architect will be sole judge of acceptability of any proposed substitution.

1.5 SUBSTITUTION REQUEST PROCEDURES – AFTER CONTRACT AWARDS

- A. Approval will be granted only when:
 - 1. Specified Product cannot be delivered without Project delay, or
 - 2. Specified Product has been discontinued, or
 - 3. Specified Product has been replaced by superior Product, or
 - 4. Specified Product cannot be guaranteed as specified, or
 - 5. Specified Product will not perform properly, or
 - 6. Specified Product will not fit within designated space, or
 - 7. Specified Product does not comply with governing codes, or
 - 8. Substitution will be clearly in Owner's interest.
- B. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

1.6 OWNER-SUPPLIED PRODUCTS

- A. See Section 01 1000 - Summary for identification of Owner-supplied products.
- B. Owner's Responsibilities:
 - 1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
 - 2. Arrange and pay for product delivery to site.
 - 3. On delivery, inspect products jointly with Contractor.
 - 4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
 - 5. Arrange for manufacturers' warranties, inspections, and service.
- C. Contractor's Responsibilities:
 - 1. Review Owner reviewed shop drawings, product data, and samples.
 - 2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
 - 3. Handle, store, install and finish products.
 - 4. Repair or replace items damaged after receipt.

1.7 CONTRACT COMPLIANCE

- A. Substitution approval does not relieve Contractor from responsibility for proper execution of the Work and for compliance with other Contract requirements.

PART 2 PRODUCTS

2.1 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by the Contract Documents.

2.2 EXISTING PRODUCTS

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the Contract Documents.

PART 3 EXECUTION

3.1 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- 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, and to minimize handling.

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 and protect products in accordance with manufacturers' instructions, and comply with manufacturer's warranty conditions, if any.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on supports above ground to eliminate trapping, including ponding of water on and below the product.
- F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- G. Prevent contact with material that may cause corrosion, discoloration, or staining.
- H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- I. 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

SECTION 01 6023

SUBSTITUTION REQUEST FORM

Project: City of Lowell Maggie Osgood Library and City Hall Renovation

Reviewer Wilson Architecture curt@wilson-architecture.com

Specified Item

Spec Number: _____ Name/Model: _____

Spec Name: _____ Line Item #: _____

Component: _____

Proposed Substitution

Manufacturer: _____ Name/Model: _____

Description: _____

Attached data includes product description, specifications, drawings, photographs, performance and test data adequate for evaluation of request including identification of applicable data portions. Attached data also includes description of changes to Contract Documents the proposed substitution requires for proper installation.

The Undersigned Certifies Following Items, Unless Modified By Attachments, Are Correct:

- 1 Proposed substitution does not affect dimensions shown on the drawings.
- 2 Undersigned pays for changes to building design, including engineering design, detailing, and construction costs caused by proposed substitution.
- 3 Proposed substitution has no adverse effect on other trades, construction schedule, or specified warranty requirements.
- 4 Maintenance and service parts are available locally or readily obtainable for proposed substitution.
- 5 Undersigned further certifies function, appearance, and quality of proposed substitution are equivalent or superior to specified item.
- 6 Undersigned further certifies that the manufacturer of the proposed substitution is aware of this substitution request and agrees to the statements noted above.
- 7 Undersigned agrees that the terms and conditions for substitutions found in bidding documents apply to this proposed substitution.

Proposer

Contact Name: _____ Firm/Company: _____

Address: _____ Phone: _____

City, St, Zip: _____ Email: _____

Signature: _____

A/E's Review and Action

- Acceptable Not Acceptable Received too Late
- Acceptable as Noted: _____

END OF SECTION

SECTION 01 7000
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Project Conditions
- B. Patching materials
- C. Examination, preparation, and general installation procedures
- D. Requirements for forming openings in existing
- E. Surveying for laying out the work
- F. Cutting and patching
- G. Cleaning and protection.
- H. Starting of systems and equipment
- I. Demonstration and instruction of Owner personnel
- J. Closeout procedures
- K. General requirements for maintenance service

1.2 RELATED SECTIONS

- A. Section 01 1000 – Summary: Owner occupancy requirements
- B. Section 01 3000 – Administrative Requirements: Coordination, submittal procedures and meeting requirements
- C. Section 01 5000 – Temporary Facilities and Controls: Dust protection and safety barriers
- D. Section 01 7419 – Construction Waste Management and Disposal: Waste management requirements
- E. Section 01 7800 – Closeout Submittals: Closeout submittals
- F. 02 4000 – Demo: Demolition requirements

1.3 PROJECT CONDITIONS

- A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- B. Dust Control
 - 1. Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
 - 2. Provide dust-proof enclosures to prevent entry of dust generated outdoors.
- C. Noise Control
 - 1. Provide methods, means, and facilities to minimize noise produced by construction operations.

2. At All Times: Excessively noisy tools and operations will not be tolerated inside the building at any time of day; excessively noisy includes jackhammers.
 3. Outdoors: Limit conduct of especially noisy exterior work to the hours of 8 am to 5 pm.
 4. Indoors: Limit conduct of especially noisy interior work to the hours of 6 pm to 7 am and/or a time agreeable to the owner.
- D. Pest and Rodent Control
1. Provide methods, means, and facilities to prevent pests and insects from damaging the work.
- E. Pollution Control
1. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

PART 2 PRODUCTS – Not Used

2.1 PATCHING MATERIALS

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

PART 3 EXECUTION

3.1 EXAMINATION

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

assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION

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

3.3 PRE-INSTALLATION CONFERENCES

- A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
- B. See Section 01 3000 – Administrative Requirements for more information.

3.4 DUST PROTECTION AND SAFETY BARRIERS – See Section 01 5000 – Temporary Facilities and Controls

3.5 LAYING OUT THE WORK

- A. Promptly notify Architect of any discrepancies discovered.

3.6 GENERAL INSTALLATION REQUIREMENTS

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

3.7 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. Perform whatever cutting and patching is necessary to:
 - 1. Complete the work.
 - 2. Fit products together to integrate with other work.
 - 3. Provide openings for penetration of mechanical, electrical, and other services.
 - 4. Match work that has been cut to adjacent work.
 - 5. Repair areas adjacent to cuts to required condition.
 - 6. Repair new work damaged by subsequent work.
 - 7. Remove samples of installed work for testing when requested.
 - 8. Remove and replace defective and non-conforming work.

- C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
 - D. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
 - E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
 - F. Restore work with new products in accordance with requirements of Contract Documents.
 - G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces, unless space is required to allow for movement. Fill residual space with sealant as required.
 - H. Sawcutting:
 - 1. Employ experienced sawcutting contractor to make all holes, or slab and pavement cutting shown in drawings for architectural, structural, mechanical and electrical work.
 - 2. Do not use water saws in occupied areas, unless otherwise approved.
 - 3. Cut openings square and plumb with sharp edges. Minimize overcutting at corners.
 - 4. Verify location of existing utilities in work area and make proper precautions to protect, disconnect and relocate, or terminate services as directed.
 - I. Patching:
 - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 - 2. Match color, texture, and appearance.
 - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.
 - J. Maintain adequate Temporary Support necessary to assure structural integrity of affected Work.
 - K. Protect other portions of Project Work against damage and discoloration.
 - L. Protect Work exposed by cutting against damage and discoloration.
 - M. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 - N. Make neat transitions. Patch work to match adjacent work in texture and appearance. Where new work abuts or aligns with existing, perform a smooth and even transition.
 - O. Patch or replace surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. Repair substrate prior to patching finish. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.
- 3.8 WASTE MANAGEMENT – See Section 01 7419 – Construction Waste Management and Disposal
- 3.9 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.10 PROTECTION OF INSTALLED WORK

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

3.11 SYSTEM STARTUP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect and owner seven days prior to start-up of each item.
- C. If the manufacturer's warranty period begins at start up, provide an extension to the warranty duration to cover the time between start up and the date of substantial completion.
- D. Verify that each piece of equipment or system is ready for start up and use. Coordinate verification and start up requirements with the manufacturer.
- E. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- F. When specified in individual specification Sections or when 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.
- G. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.12 DEMONSTRATION AND INSTRUCTION

- A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.
- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of owner personnel.
- E. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- G. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.

3.13 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.
- B. Testing, adjusting, and balancing HVAC systems: See requirements in Division 23 for testing, adjusting, and balancing for HVAC.

3.14 FINAL CLEANING

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

3.15 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing or other authorities.

- B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.
- C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.
- D. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.
- E. Mechanical & Electrical Equipment start-up:
 - 1. Coordinate check-out of Utilities, Operational Systems, and Equipment.
 - 2. Assist in initial start-up and testing.
 - 3. Record starting dates of Systems and Equipment operation.
- F. At completion of Work of each Subcontract, conduct inspection to assure that:
 - 1. Work is acceptable.
 - 2. Specified cleaning has been accomplished, and Temporary Facilities and Debris has been removed from Site.
- G. Substantial Completion:
 - 1. Conduct inspection and prepare list of Work to be completed or corrected.
 - 2. Assist Architect in review of contractor's inspection list and generation of substantial completion punch list.
 - 3. Supervise correction and completion of Work as established in Architect's Observation Reports and substantial completion punch list.
 - 4. Apply for and receive Final Occupancy Permit from Building Department.
 - 5. Complete submittal of Operations and Maintenance Manuals.
 - 6. Complete submittal of Record Drawings.
 - 7. Complete Owner Training.
- H. Final Completion:
 - 1. Assist Architect in checking that all identified deficiencies have been corrected.

END OF SECTION

SECTION 01 7419

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Waste management performance requirements
- B. Waste management plan
- C. Implementation of waste management plan

1.2 RELATED REQUIREMENTS

- A. Section 01 5000 - Temporary Facilities and Controls: Staging and use of site
- B. Section 01 7000 - Execution and Closeout Requirements: Cutting and patching
- C. Section 02 4000 – Demo: Removal of existing material

1.3 PERFORMANCE 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. 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.
- E. 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.

PART 2 PRODUCTS – Not Used

PART 3 EXECUTION

3.1 PLAN IMPLEMENTATION

- A. Create a waste management plan for use during the project to divert demolition and construction material from the land fill.
- B. Manager
 - 1. Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
- C. Instruction

1. Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

D. Meetings

1. Discuss trash/waste management goals and issues at construction team meetings.

E. Facilities

1. Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.

F. Provide containers as required.

3.2 COLLECTION

A. Provide adequate space for pick-up and delivery and convenience to subcontractors.

B. Provide all necessary containers, bins and storage areas to facilitate effective waste management in accordance with requirements outlined herein.

C. Clearly identify containers, bins and storage areas so that recyclable materials are separated from trash and can be transported to respective recycling facility for processing.

D. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.

E. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.

F. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

3.3 DISPOSAL

A. Contractor shall be responsible for transporting and disposing of materials that cannot be delivered to a source-separated or mixed materials recycling facility to a transfer station or disposal facility that can accept the materials in accordance with state and federal regulations.

B. Construction or demolition materials with no practical reuse or that cannot be salvaged or recycled shall be disposed of.

END OF SECTION

SECTION 017800
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES

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

1.2 SUBMITTALS

A. General

- 1. Provide searchable pdf format and one set of manuals in their final version.

B. Project Record Documents:

- 1. Submit documents to Architect prior to Substantial Completion.

C. Operation and Maintenance Data:

- 1. Submit preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and provide comments.
- 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. Submit completed documents 30 days prior to scheduled date of substantial completion for review and comments. Revise content of all document sets as required prior to final submission.
- 4. Submit the revised final documents prior to date of Substantial Completion.
- 5. Either the draft or final version of the O&M manuals must be on the project site during any of the operator training scheduled for the project.

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. Provide all other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
- 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.
- 4. Submit final version prior to date of Substantial Completion.

PART 2 PRODUCTS – Not Used

PART 3 EXECUTION

3.1 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
- B. Maintenance of documents and samples.
 - a. Store in Contractor's Field Office apart from Documents used for Construction.
 - b. Provide Files, Shelving and Cabinets necessary to safely and securely store Documents and Samples.
 - c. Maintain Documents in a clean, dry, legible, and good order.
 - d. Do not use Record Documents for Construction Purposes.
 - e. Make Documents available at all time for Architect's inspection
- C. Ensure entries are complete and accurate, enabling future reference by Owner.
- D. Store record documents separate from documents used for construction.
- E. Record information concurrent with construction progress.
- F. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and modifications.
- G. Record Drawings : Legibly mark each item to record actual construction including:
 - 1. Measured depths of foundations in relation to finish first floor datum.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 4. Field changes of dimension and detail.
 - 5. Details not on original Contract drawings.

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.
- E. 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.
- F. 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.

3.3 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. In addition to requirements called for in other sections of this manual, provide the following:
- B. 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.
- C. 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.
- D. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- E. Include color coded wiring diagrams as installed.
- F. 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.
- G. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- H. Provide servicing and lubrication schedule, and list of lubricants required.
- I. Include manufacturer's printed operation and maintenance instructions.
- J. Include sequence of operation by controls manufacturer.
- K. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- L. Provide control diagrams by controls manufacturer as installed.
- M. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.
- N. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

- O. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- P. Include test and balancing reports.

3.4 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. Assemble operation and maintenance data into durable manuals 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 tabbed divider for each system.
- C. Digital O&M Manuals: In addition to binders described below, prepare manuals as PDF documents organized like the printed manuals
 - 1. Digital copies of O&M Manuals must be organized by section.
- D. Paper & 3 Ring Binder O&M Manuals: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size.
 - 1. When multiple binders are used, correlate data into related consistent groupings.
- E. 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. Operation and maintenance data.
 - c. Field quality control data.
 - d. Original warranties and bonds.

3.5 WARRANTIES AND BONDS

- A. 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 direction, leave date of beginning of time of warranty until the Date of Substantial completion is determined.
- B. Retain warranties and bonds until time specified for submittal.
- C. Cover; provide the following:
 - 1. Title each volume "WARRANTIES AND BONDS"
 - 2. Owner and Project title as shown in Specification Section 01 1000 – Summary
 - 3. General Contractors name, address and telephone number
 - 4. Subcontractor and equipment supplier; company name, address, telephone number and name of primary company contact.
- D. 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.

- E. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing.
 - 1. Provide full information, using separate typed sheets as necessary.
 - 2. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of primary company contact.
- 3.6 CONTRACTOR'S CLOSEOUT SUBMITTALS TO ARCHITECT
 - A. Building Official's Certificate of Mechanical & Electrical Inspections.
 - B. Building Official's Certificate of Occupancy.
- 3.7 SPARE PART & MAINTENANCE MATERIAL SUBMITTALS TO OWNER
 - A. All spare parts and extra material are to be delivered to the owner prior to the date of substantial completion. Provide written confirmation of delivery, noting quantity and description as well as storage location. Obtain written acknowledge from Owner for receipt of stored items. Verification email from the Owner is acceptable.
 - B. Storage location: where directed by Owner.
 - C. See individual specifications sections for additional requirements.

END OF SECTION

SECTION 02 4100

DEMOLITION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Select building demo to support alterations
- B. Hazardous materials declaration

1.2 RELATED REQUIREMENTS

- A. Section 00 3100 - Available Project Information: Existing building survey conducted by Owner; information about known hazardous materials.
- B. Section 01 1000 - Summary: Limitations on Contractor's use of site and premises; sequencing and staging requirements; description of items to be salvaged or removed for re-use by Contractor.
- C. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures
- D. Section 01 3000 – Administrative Requirements: Submittal review procedures
- E. Section 01 5000 - Temporary Facilities and Controls: Security, and protective barriers
- F. Section 01 6000 – Product Requirements: Substitution request procedures
- G. Section 01 7419 - Construction Waste Management and Disposal: Waste removal
- H. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures

1.3 REFERENCE STANDARDS

- A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Schedule: Submit for approval demolition schedule, including schedule and methods for capping utilities to be abandoned and maintaining existing utility service.
- C. Project Record Documents
 - 1. Accurately record actual locations of capped and active utilities and subsurface construction.

1.5 QUALITY ASSURANCE

- A. Codes and Regulations: Comply with governing codes and regulations. Use experienced workers.
- B. Pre-Installation Meetings
 - 1. Convene minimum two weeks prior to starting work of this section.

1.6 SEQUENCING

- A. Immediate areas of work will not be occupied during demolition. The public, including children, may occupy adjacent areas.

- B. No responsibility for buildings and structures to be demolished will be assumed by the Owner.
- C. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

PART 2 PRODUCTS – Not Used

PART 3 EXECUTION

3.1 SCOPE

- A. Remove items indicated, for salvage, relocation, recycling, and to prepare the identified interior building areas for work shown on drawings.
 - 1. Contractor shall maximize use of removed or salvaged products, material, finishes and equipment for use in other parts of this project where similar products, materials, finishes and equipment are shown on the drawings.

3.2 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 - 1. Obtain required permits.
 - 2. Provide, erect, and maintain temporary barriers and security devices.
 - 3. Maintain existing circulation systems, or create new passageways for safe access through the building by workers or construction site visitors.
 - 4. Use physical barriers to prevent access to areas that could be hazardous to workers or construction site visitors.
 - 5. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 - 6. Do not close or obstruct roadways or sidewalks without permit.
 - 7. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
 - 8. Use temporary enclosures, and other suitable methods as necessary, to limit the amount of dust and dirt rising and scattering in the air, to the lowest level of air pollution practical for the conditions of work.
- B. Do not begin removal until receipt of notification to proceed from Owner.
- C. Do not begin removal until built elements to be salvaged or relocated have been removed.
- D. Protect existing structures and other elements that are not to be removed.
 - 1. Provide bracing and shoring as necessary.
- E. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

- F. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.
- G. Perform demolition in a manner that maximizes salvage and recycling of materials.
 - 1. Dismantle existing construction and separate materials.
 - 2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.
- H. Conform to applicable regulations relating to environmental requirements, disposal of debris, and noise control.
- I. Burning not permitted.

3.3 EXISTING UTILITIES

- A. Protect existing utilities to remain from damage.
- B. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
- C. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
- D. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.
- E. Remove exposed piping, valves, meters, equipment, supports, conduit, wiring, and foundations of disconnected and abandoned utilities.

3.4 SELECTIVE DEMOLITION FOR ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 - 1. Verify that construction and utility arrangements are as shown.
 - 2. Report discrepancies to Architect before disturbing existing installation.
 - 3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
- B. Remove existing work as indicated and as required to accomplish new work.
 - 1. Remove items indicated on drawings. Note, not all required demolition is indicated on the drawings.
- C. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications):
 - 1. Remove existing systems and equipment as indicated.
 - 2. Maintain existing active systems, including necessary components to remain in operation unless specifically noted on the Drawings to be removed; maintain access to equipment and operational components.

3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 4. Verify that abandoned services serve only abandoned facilities before removal.
 5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.
 6. Where components of operational systems are to be removed, relocated, and re-connected to the operational system, remove in a manner to avoid damage and to facilitate reuse.
- D. Protect existing work to remain.
1. Prevent movement of structure; provide shoring and bracing if necessary.
 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 3. Repair adjacent construction and finishes damaged during removal work.
 4. Patch as specified for patching new work.
- E. Preparation of Existing Surfaces for New Work
1. Remove existing finishes at surfaces to receive new work.
 2. Remove all existing irregular and regular materials which cause rises, depressions, or voids in existing surfaces to receive new finishes. Examples include, but are not limited to:
 - a. Irregular or rough concrete slabs.
 - b. Fasteners.
 - c. Outlet cores, cover plates.
 3. Retain existing substrates, unless scheduled to be removed and replaced.

3.5 SALVAGE

- A. Salvage for Reuse:
1. Identify materials shown on the drawings for removal that can be reused in the project for a similar use and in a new location as shown on drawings.
 2. Coordinate carefully, the removal of items to be reused with the requirements of reinstallation.
 3. Carefully remove, clean, pack as necessary and store for reuse. Protect from damage until reinstalled.
- B. Damaged items:
1. If items to be reused are damaged during removal, storage or reinstallation, repair or replace with new to match existing condition prior to start of the work.
- C. Other Salvage:
1. Title to all other material to be removed is vested in the Contractor upon notice of award.

3.6 DEBRIS AND WASTE REMOVAL

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.
- D. Clean remaining structure, equipment, and facilities of all dirt, dust and debris caused by demolition work. Return areas to conditions existing prior to the start of the work.

3.7 HAZARDOUS MATERIALS DECLARATION

- A. The building was recently evaluated for Materials Containing Asbestos. None was found, however the results were based on sampling at about 80 location. By this notice, the Contractor and the Sub-contractors, and their workers, are asked to be aware of the possible presence of Asbestos Bearing Materials and if found, or even suspected, to immediately stop work in the area, and notify the Architect and/or the Owner of the location and condition. A separate independent contract will be issued by the Owner to have the suspected material tested and if needed removed or encapsulated.

END OF SECTION

SECTION 06 1000
ROUGH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Structural dimension lumber framing.
- B. Rough opening framing for doors, windows, and roof openings.
- C. Standard sheathing (construction panels).
- D. Preservative treated wood materials.
- E. Miscellaneous framing and sheathing.
- F. Communications and electrical room mounting boards.
- G. Concealed wood blocking, nailers, and supports.
- H. Anchor Bolts and embeds for Rough Carpentry.

1.2 RELATED REQUIREMENTS

- A. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures.
- B. Section 01 3000 – Administrative Requirements: Submittal review procedures.
- C. Section 01 6000 – Product Requirements: Substitution request procedures.
- D. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.
- E. Section 06 2000 - Finish Carpentry
- F. Section 07 2500 - Weather Barriers: Air barrier over sheathing.
- G. Section 09 2116 - Gypsum Board Assemblies: Gypsum-based sheathing.

1.3 REFERENCE STANDARDS

- A. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; 2015.
- B. AFPA (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; 2012.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2016.
- F. AWWPA U1 - Use Category System: User Specification for Treated Wood; 2016.
- G. OSSC - Oregon Structural Specialty Code; latest edition.
- H. PS 1 - Structural Plywood; 2009.
- I. PS 20 - American Softwood Lumber Standard; 2015.

J. WWPA G-5 - Western Lumber Grading Rules; 2011.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data

1. Submit manufacturer's product data and installation instructions.
2. Structural Composite Lumber:
 - a. Submit manufacturer's published structural data including span tables, marked to indicate which sizes and grades are being used; if structural composite lumber is being substituted for dimension lumber or timbers, submit grading agency structural tables marked for comparison.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements

1. Comply with the applicable requirements of Oregon Structural Specialty Code, latest edition.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Storage

1. Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Dimension Lumber

1. Comply with PS 20 and requirements of specified grading agencies.

B. Species

1. Douglas Fir-Larch, unless otherwise indicated.

C. Grading Agency

1. Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

2.2 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

A. Dimension

1. Sizes: Nominal sizes as indicated on drawings, S4S.

B. Description

1. Grading Agency: Western Wood Products Association; WWPA G-5.
2. Moisture Content: S-dry or MC19.
3. Species: Any allowed under referenced grading rules.

C. Grade by Type and Location

1. Stud Framing
 - a. 2 by 2 through 2 by 6
 - b. Grade: No. 2.
2. Joist, Rafter, and Small Beam Framing
 - a. 2 by 6 through 4 by 16
 - b. Grade: No. 2 Unless Noted Otherwise.
3. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - a. Lumber: S4S, No. 2 or Standard Grade.
 - b. Boards: Standard or No. 3.

2.3 CONSTRUCTION PANELS

A. Roof Sheathing

1. Span Rating: 40/20.
2. Dimension
 - a. Thickness: See Structural Drawings; [5/8 inch, nominal](#).
 - b. Panel Size: 48 x 96 inches.
3. Description
 - a. APA PRP-108, Rated Sheathing, Exposure 1, and as follows:
 - b. Species: Group 2 or better.
 - c. Edges: Square.

B. Wall Sheathing: APA PRP-108, Rated Sheathing, Exposure 1, and as follows:

1. Dimension
 - a. Span Rating: 32/16.
 - b. Thickness: 1/2 inch, nominal.
 - c. Panel Size: 48 x 96 inches.
2. Description
 - a. Bond Classification: Exposure 1.
 - b. Thickness: See Structural Drawings

2.4 ACCESSORIES

A. Fasteners and Anchors:

1. Metal and Finish
 - a. Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
2. Machine Bolts, Nuts, Washers, and Screws

- a. Conforming to ASTM A307, galvanized where exposed.
- 3. Lag Bolts and Wood Screws
 - a. ANSI/ASME B18.6.1-1981, zinc plated.
- 4. Threaded Rods
 - a. ASTM A36 or ASTM A307.
- 5. Anchor Bolts
 - a. ASTM A 307, Grade C.
- 6. Washers
 - a. Provide Hot-dip Galvanized Steel Washers under Bolt Heads, Lag Heads, and Nuts adjacent to all wood framing members.
- 7. Epoxy Anchors
 - a. At CMU: "HIT HY-150 Max" by Hilti
 - b. At concrete: "HIT-RE 500 SD" by Hilti.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- 8. Powder Actuated Fasteners:
 - a. To Steel: "DS with Washer", by Hilti, or "Power Point with Washer", by Ramset/Redhead.
 - b. To Concrete (non-seismic applications only): "DN72 with Washer", by Hilti.
 - c. To Concrete Masonry (non-seismic applications only): "DXE72 with Washer", by Hilti.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- 9. Self-drilling screws of wood-to-wood connections: Simpson SDS series or approved.
- 10. Self-drilling screws to light-gage framing: "Traxx" by ITW Buildex or approved; with break-off wings, flat or bugle head.
- B. Framing Connectors
 - 1. Zinc-coated steel; Simpson, or approved. Connector model numbers shown on Drawings are taken from Simpson Catalog. If specific type is not shown on Drawings, use type recommended by Manufacturer for conditions of installation.
 - 2. Joist Hangers: Hot dipped galvanized steel, sized to suit framing conditions.
 - 3. For contact with preservative treated wood in exposed locations, provide minimum G185 galvanizing complying with ASTM A653/A653M.
- C. Sill Gasket
 - 1. 1/4 inch thick, plate width, closed cell plastic foam from continuous rolls.
 - 2. Extent: between sill plate and concrete foundation wall
- D. Subfloor Adhesives
 - 1. Waterproof, air cure type, cartridge dispensed.

2.5 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWWA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
 - 1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWWA standards.
- B. Preservative Treatment:
 - 1. Preservative Pressure Treatment of Lumber Above Grade: 1, Use Category UC3B, Commodity Specification A using waterborne preservative to 0.25 lb/cu ft retention.
 - 2. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
 - 3. Treat lumber in contact with roofing, flashing, or waterproofing.
 - 4. Treat lumber in contact with masonry or concrete.
 - 5. Treat lumber in other locations as indicated.

PART 3 EXECUTION

3.1 PREPARATION

- A. Install sill gasket under sill plate of framed walls bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts.
- B. Coordinate installation of rough carpentry members specified in other sections.

3.2 INSTALLATION

- A. Installation – General
 - 1. Select material sizes to minimize waste.
 - 2. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
 - 3. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.
- B. Installation – Framing Material
 - 1. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.
 - 2. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.
 - 3. Install structural members full length without splices unless otherwise specifically detailed.
 - 4. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AWC (WFCM) Wood Frame Construction Manual.

5. Install horizontal spanning members with crown edge up and not less than 1-1/2 inches of bearing at each end.
6. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed. Space to provide clearance for pipes in partitions.
7. Provide bridging at joists in excess of 8 feet span as detailed. Do not anchor until Dead Loads are in place. Space bridging members 1/4 inch apart to avoid members rubbing against each other. Fit solid blocking at ends of members.
8. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.
9. Do not notch, bore, or drill framing members except as noted on Drawings, or as approved by Engineer.
10. Do not install composite lumber in contact with concrete. Provide treated dimension lumber for plates in contact with foundations.
11. Provide preservative-treated wood nailers on roof deck as indicated on Drawings or as required by membrane roofing manufacturer.
 - a. Coordinate thickness of nailer with thickness of roof insulation.

C. Installation – Blocking, Nailers, and Supports

1. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
2. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.
3. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
4. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
5. Provide the following specific non-structural framing and blocking:
 - a. Cabinets and shelf supports.
 - b. Wall brackets.
 - c. Handrails.
 - d. Grab bars.
 - e. Towel and bath accessories.
 - f. Wall-mounted door stops.
 - g. Visual display boards.
 - h. Wall paneling and trim.
 - i. Joints of rigid wall coverings that occur between studs.

- D. Installation – Roof-Related Carpentry
 - 1. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
- E. Installation - Installation of Construction Panels
 - 1. Roof Sheathing
 - a. Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
 - b. At long edges provide solid edge blocking where joints occur between roof framing members.
 - c. Nail panels to framing; staples are not permitted.
 - 2. Wall Sheathing
 - a. Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using fasteners as indicated on Drawings.
 - b. Wall Sheathing: Secure with ends over firm bearing and staggered, using fasteners as indicated on Drawings.
 - c. Block unsupported edges at shearwalls as shown on Drawings.
 - d. Drive sheathing fasteners flush with panel face, do not overdrive.
 - 3. Install panels with a minimum 1/16 inch, maximum 1/8 inch gap between adjoining panels.
- F. Installation – Accessories and Fastener Installation
 - 1. Provide Framing Connectors where indicated; secure with fasteners recommended by manufacturer to achieve maximum load capacity.
 - 2. Provide Washers under Nuts and Heads when making Bolted or Lag Screwed connections.
 - 3. Drive Nails perpendicular to Grain in lieu of toe-nailing where feasible.
 - 4. Lag Screws
 - a. Pre-drill to 70% of the shank diameter in supporting member, 1/32 to 1/16 inch larger than shank diameter in attached members. Use standard cut washer between bolt head and wood. Install Lag Screws by turning, do not drive with hammer.
 - 5. Nails and Screws
 - a. Fasten members as shown on Drawings. Pre-drill holes as required to prevent splitting of members. Nailed connections not shown on Drawings or specified by manufacturer shall conform to the building code.
 - 6. Bolts
 - a. Set in holes 1/32 inch to 1/16 inch larger than bolt through wood member. Tighten to snug position. Use cut washer between nut or bolt head and wood.
 - 7. Powder-Driven Connectors

- a. Select size and type for full penetration into substrate without splitting connected wood members or fracturing substrate. Use washer under head to prevent over-driving.

G. Installation - Site Applied Wood Treatment

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

3.3 FIELD QUALITY CONTROL

A. Tolerances

1. Framing Members: 1/4 inch from true position, maximum.
2. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

END OF SECTION

SECTION 06 2000
FINISH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Interior and exterior finish carpentry items, including running trim and panel material.
- B. Hardware and attachment accessories.

1.2 RELATED REQUIREMENTS

- A. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures.
- B. Section 01 3000 – Administrative Requirements: Submittal review procedures.
- C. Section 01 6000 – Product Requirements: Substitution request procedures.
- D. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.
- E. Section 06 1000 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- F. Section 06 4100 - Architectural Wood Casework: Shop fabricated custom cabinet work.
- G. Section 09 9000 – Painting and Coating: Painting and finishing of finish carpentry items.

1.3 REFERENCE STANDARDS

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; latest edition.
- B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.0; latest edition.
- C. OSSC - Oregon Structural Specialty Code, latest edition.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data
 - 1. Provide instructions for attachment hardware and finish hardware.
- C. Shop Drawings
 - 1. Indicate materials, component profiles, fastening methods, jointing details, and accessories.
- D. Samples
 - 1. Purpose: To review grain, appearance, and finish;
 - 2. Quantity: (2).
 - 3. Size: 8 in x 8 in

1.5 QUALITY ASSURANCE

- A. Quality Standards

B. Qualifications

1. Fabricator and Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years of experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Storage

1. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes.

1.7 SEQUENCING

- A. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.
- B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

PART 2 PRODUCTS

2.1 PRODUCT GENERAL REQUIREMENTS

A. Quality Standard

1. Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

B. Surface Burning Characteristics

1. Provide materials having fire and smoke properties as required by applicable code.

2.2 LUMBER MATERIALS

A. Interior Hardwood Trim

1. Material

- a. White Maple species; PS 20, AWI Premium Grade; plain sawn, smooth texture; mixed grain; maximum moisture content of 6 percent; suitable for clear finish.

2. Description

- a. Ease exposed edges with 1/16 inch radius, unless otherwise shown.
- b. Minimum lengths: Opening & Standing Trim: 1 piece, single length. Running Trim: Joints minimum 12 feet apart.

B. Interior Painted Wood Trim

1. Material

- a. Douglas Fir, Hem-Fir, or Poplar species; PS 20, AWI Custom Grade; smooth sawn, mixed grain; maximum moisture content of 6 percent; suitable for painted finish.

2. Description

- a. Ease exposed edges with 1/16inch radius, unless otherwise shown.

- b. Minimum lengths: Opening & Standing Trim: 1 piece, single length. Running Trim: Joints minimum 12 feet apart.
 - c. Thickness: 3/4" unless noted otherwise.
- C. Interior Painted MDF Trim
 - 1. Product and Manufacturers
 - a. "Medite II", by Sierrapine.
 - b. Substitutions: See Section 01 6000 – Product Requirements.
 - 2. Material
 - a. Medium Density Fiberboard (MDF); Industrial Grade engineered wood-based panel, water resistant, manufactured with a formaldehyde-free binder and which meets the requirements of ANSI A208.2-1994, product class MD.
 - 3. Description
 - a. Ease exposed edges with 1/16 inch radius, unless otherwise shown.
 - b. Minimum lengths: Opening & Standing Trim: 1 piece, single length. Running Trim: Joints minimum 12 feet apart.

2.3 SHEET MATERIALS

- A. MDO Painted Plywood Wall Panels
 - 1. Manufacturers
 - a. Eagle Plywood Specialties.
 - b. Pacific Wood Laminates.
 - c. Substitutions: See Section 01 6000 – Product Requirements.
 - 2. Material
 - a. Douglas Fir species; exterior rated; edges square, one side faced with medium-density overlay, smooth surface texture.
 - b. Surface Material: Medium Density Overlaid - U. S. Product Standard PS-1 95.
 - 3. Description
 - a. Thickness: 5/8 inch, UNO on the Drawings.
 - b. Edges: Square
 - 4. Finish
 - a. Factory prime all surfaces prior to installation.

2.4 FASTENERS

- A. Of size and type to suit application.

2.5 ACCESSORIES

- A. Glass: Type tempered as specified in Section 08 8000.
- B. Wood Filler: Solvent base, tinted to match surface finish color.

2.6 FABRICATION

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

PART 3 EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions
 - 1. Verify adequacy of backing and support framing.
 - 2. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.2 INSTALLATION

- A. Install work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.
- D. Miter corners.
- E. Use concealed fasteners wherever possible, unless noted otherwise on Drawings.
- F. At fasteners installed through the exposed surface(s) of the trim, countersink and/or set fasteners low enough to accommodate wood plugs or wood filler.
- G. Ease sharp external corners prior to finishing.

3.3 PREPARATION FOR SITE FINISHING

- A. Set exposed fasteners. Apply wood filler in exposed fastener indentations less than 1/4 inch in diameter, and wood plugs in indentations 1/4 inch or greater. Sand work smooth.

3.4 FIELD QUALITY CONTROL

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

3.5 PROTECTION

- A. Protect work from damage after installation.

END OF SECTION

SECTION 06 4100

CASEWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Specially fabricated cabinet units.
- B. Cabinet hardware.
- C. Factory finishing.
- D. Preparation for installing utilities.

1.2 RELATED REQUIREMENTS

- A. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures.
- B. Section 01 3000 – Administrative Requirements: Submittal review procedures.
- C. Section 01 6000 – Product Requirements: Substitution request procedures.
- D. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.
- E. Section 06 1000 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- F. Section 12 3600 - Countertops.

1.3 REFERENCE STANDARDS

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; latest edition.
- B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.0; latest edition.
- C. NEMA LD 3 - High-Pressure Decorative Laminates; latest edition.
- D. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; latest edition.
- E. NEMA LD 3 - High-Pressure Decorative Laminates; latest edition.
- F. OSSC - Oregon Structural Specialty Code, latest edition.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data
 - 1. Submit hardware manufacturer's product data and installation instructions.
- C. Shop Drawings
 - 1. Indicate materials, component profiles and elevations, fastening methods, jointing details, connections to adjacent work, schedule of finishes, and accessories.
- D. Samples
 - 1. Cabinet Hardware, each item

- a. Quantity: (1)
- b. Size: Actual size
2. Plastic laminate color specified, each
 - a. Quantity: (2)
 - b. Size: 4 in. x 5 in.
3. Plastic laminate edge banding, each
 - a. Quantity: (2)
 - b. Size: 12 in. long
4. Hardwood veneer species, each specified, indicating cut and color of material used on this project.
 - a. Quantity: (2)
 - b. Size: 12 in. x 12 in.
5. Lumber trim species, each specified
 - a. Quantity: (2)
 - b. Size: 12 in. long

1.5 QUALITY ASSURANCE

A. Qualifications

1. Fabricator Qualifications: Company specializing in performing the work of this section with minimum 3 years of experience.

B. Regulatory Requirements

1. Comply with the applicable requirements of Oregon Structural Specialty Code, latest edition.

C. Mock-ups

1. Provide mock-up of typical base cabinet, wall cabinet, and countertop, including hardware, finishes, and plumbing accessories.
2. Mock-up may remain as part of the Work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Acceptance at Site

1. Do not deliver casework to jobsite until notified by General Contractor that Project is conditioned and prepared to handle and store casework without damage or discoloration.

B. Storage

1. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes.

1.7 PROJECT/SITE CONDITIONS

- A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

1.8 SEQUENCING

- A. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.
- B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

PART 2 PRODUCTS

2.1 PRODUCT GENERAL REQUIREMENTS

- A. Quality Standard: **Custom** grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Plastic Laminate Faced Cabinets: **Custom** grade.

2.2 WOOD-BASED COMPONENTS

- A. Softwood lumber
 - 1. Materials
 - a. NIST PS 20; graded in accordance with AWI standard indicated, average moisture content 6 percent, Doug Fir or Hemlock species.
- B. Hardwood Veneer Plywood
 - 1. Dimensions
 - a. Thickness: 3/4 inch.
 - 2. Materials
 - a. NIST PS1, AWI Premium Grade, core materials of veneer or MDF, type of glue recommended for application, Natural Maple species.
 - 3. Description
 - a. Plain-sliced, slip-matched
- C. Apple-ply Plywood
 - 1. Product and Manufacturers
 - a. "Apple-ply" by States Industries.
 - b. "Europly" by Colombia Forest Products.
 - c. Substitutions: See Section 01 6000 – Product Requirements.
 - 2. Dimensions
 - a. Thickness: 3/4 inch.
 - 3. Materials
 - a. Natural Birch species, AWI Premium Grade, PS51.

4. Description
 - a. Plain sliced, random match, no voids, faced on both sides.

2.3 LAMINATE MATERIALS

A. Products and Manufacturers

1. "Formica Laminate" by Formica Corporation
2. "Pionite" by Panolam Industries International, Inc.
3. "High Pressure Laminate" by Wilsonart Engineered Surfaces.
4. Substitutions: See Section 01 6000 – Product Requirements.

B. Description

1. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.

C. Characteristics by Application

1. Horizontal Surfaces (HGS)
 - a. 0.048 in. nominal thickness.
 - b. Colors as scheduled, finish as scheduled.
2. Vertical Surfaces (VGS)
 - a. 0.028 in. nominal thickness,.
 - b. Colors as scheduled, finish as scheduled.
3. Cabinet Liner (CLS)
 - a. 0.020 in. nominal thickness.
 - b. Colors as scheduled, finish as scheduled.
4. Laminate Backer (BKL)
 - a. 0.020 in. nominal thickness.
 - b. Undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.

2.4 HARDWARE AND COMPONENTS

A. Adjustable Shelf Supports

1. Description
 - a. Standard side-mounted system using multiple holes for pin supports and coordinated self rests, polished chrome finish, for nominal 1 inch spacing adjustments.
2. Extent
 - a. At adjustable shelves.

B. Drawer and Door Pulls

1. Description
 - a. European Bar Pull, 6 inches long, brushed stainless steel look.
 2. Product and Manufacturer(s)
 - a. "101.20.729" by Hafele.
 - b. Substitutions: See Section 01 6000 – Product Requirements.
 3. Extent
 - a. Cabinet doors and drawers
- C. Cabinet Locks
1. Description
 - a. Keyed cylinder with standard or custom-fabricated strike plate to fit the style of casework detailed.
 2. Manufacturer:
 - a. National Lock
 - b. Russwin
 - c. Yale
 - d. Substitutions: See Section 01 6000 - Product Requirements.
 3. Extent
 - a. (2) keys per lock, each room different and master keyed, steel with satin finish. Locate where shown on Drawings.
- D. Drawer Slides:
1. Description
 - a. Type: Full extension.
 - b. Static Load Capacity: Heavy Duty grade.
 - c. Mounting: Side mounted.
 - d. Stops: Integral Type
 2. Manufacturers:
 - a. Accuride International, Inc.
 - b. Julius Blum, Inc.
 - c. Knape & Vogt Manufacturing Company.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
 3. Extent
 - a. Drawers
- E. Hinges
1. Description

- a. European style concealed self-closing type, steel with polished finish.
 - 2. Manufacturers
 - a. Julius Blum, Inc: www.blum.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
 - 3. Extent
 - a. At cabinet doors.
- F. Countertop Supports – Existing Wall Applications
 - 1. Description
 - a. 5mm thick steel construction, epoxy coated.
 - b. Color: White
 - c. Size: 550mm (21.7" deep x 14.2" high).
 - d. Loaded capacity, up to 1,000 pounds per pair.
 - 2. Product and Manufacturer(s)
 - a. "#208 Ultimate L-Bracket" by Knape & Vogt.
 - b. Substitutions: See Section 01 6000 – Product Requirements.
 - 3. Extent
 - a. At restroom counters.
- G. Countertop Supports – New wall locations
 - 1. Description
 - a. Aluminum, clear anodized finish; 14 in.
 - 2. Product and Manufacturer(s)
 - a. "Inside Wall Support Bracket (size per below) FM" by Rakks.
 - b. Substitutions: See Section 01 6000 – Product Requirements.
 - 3. Extent
 - a. At City Hall Transaction Counter, Lobby Side: EH-1209-FM/ADA.
 - b. At City Hall Transaction Counter, Office Side: EH-1212-FM.
 - c. At Library Service Desk, and other locations not noted above: EH-1818-FM.
- H. Utility Grommets
 - 1. Description
 - a. Aluminum, with removable cap.
 - b. 3 1/2 inch O.D., with brush;
 - 2. Product and Manufacturer(s)
 - a. "ABG3-94" by Doug Mockett & Company.

- b. Substitutions: See Section 01 6000 – Product Requirements.
 - 3. Extent
 - a. Where shown on the Drawings.
 - I. Coat Rod and Flanges
 - 1. Description
 - a. Integral, wall mounted, chrome metal finish.
 - 2. Products and Manufacturers
 - a. "660SS Series" with matching chrome Flanges at each end by Knappe & Vogt.
 - b. Substitutions: See Section 01 6000 – Product Requirements.
 - 3. Extent
 - a. Closets and wardrobe units and other locations where noted on the Drawings.
 - J. Door Silencers
 - 1. Description
 - a. Felt or rubber with adhered back to prevent noisy door to frame contact.
 - 2. Extent
 - a. At locations where cabinet doors or pulls hit adjacent walls, window sills, or other building elements.
- 2.5 ACCESSORIES
- A. Adhesive
 - 1. Type recommended by fabricator to suit application.
 - B. Bolts, Nuts, Washers, Lags, Pins, and Screws
 - 1. Of size and type to suit application; chrome-plated finish in concealed locations and stainless steel finish in exposed locations.
 - C. Concealed Joint Fasteners
 - 1. Threaded steel.
 - D. Other Fasteners
 - 1. Size and type to suit application.
- 2.6 FABRICATION
- A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.
 - B. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
 - C. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.

- D. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
 - 1. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
 - 2. Cap exposed plastic laminate finish edges with material of same finish and pattern.
- E. Matching Wood Grain: Comply with requirements of quality standard for specified Grade and as follows:
- F. Provide cutouts for plumbing fixtures, appliances, and other built-in items. Verify locations of cutouts from on-site dimensions. Seal cut edges.
- G. All shelves shall be adjustable, unless required to be fixed in place for the stability of the casework, or as otherwise noted on Drawings.

2.7 SHOP FINISHING

- A. Sand work smooth and set exposed nails and screws.
- B. Ease sharp external corners prior to finishing.
- C. On items to receive transparent finishes, use wood filler matching or blending with surrounding surfaces and of types recommended for applied finishes.
- D. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
 - 1. Transparent:
 - a. System - 5, Varnish, Conversion.
 - b. Sheen: Flat.
 - 2. Opaque:
 - a. Color: As selected by Architect.
 - b. Sheen: Flat.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions
 - 1. Verify adequacy of backing and support framing.
 - 2. Verify location and sizes of utility rough-in associated with work of this section.

3.2 INSTALLATION

- A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- B. Use concealed joint fasteners to align and secure adjoining cabinet units.
- C. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- D. Secure cabinets to floor using appropriate angles and anchorages.

- E. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

3.3 FIELD QUALITY CONTROL

A. Adjusting

1. Adjust installed work.
2. Adjust moving or operating parts to function smoothly and correctly.

3.4 CLEANING

- #### A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

SECTION 07 2100
THERMAL INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Batt insulation and vapor retarder.
- B. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.
- C. Glass fiber blanket insulation.
- D. Spray foam surface insulation

1.2 RELATED REQUIREMENTS

- A. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures.
- B. Section 01 3000 – Administrative Requirements: Submittal review procedures.
- C. Section 01 6000 – Product Requirements: Substitution request procedures.
- D. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.
- E. Section 09 2116 - Gypsum Board Assemblies: Acoustic insulation inside walls and partitions.

1.3 REFERENCE STANDARDS

- A. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2014.
- C. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2012.
- D. OSSC - Oregon Structural Specialty Code, latest edition.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data
 - 1. Submit manufacturer's product data and installation instructions.
- C. Quality Assurance Submittals
 - 1. Manufacturer's Instructions
 - a. Include information on special environmental conditions required for installation and installation techniques.

1.5 QUALITY ASSURANCE

- A. Quality Standards

1. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test- response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - a. Surface-Burning Characteristics: ASTM E 84.
 - b. Fire-Resistance Ratings: ASTM E 119.
 - c. Combustion Characteristics: ASTM E 136.
 - B. Qualifications
 1. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum 3 years of experience.
 - C. Regulatory Requirements
 1. Comply with the applicable requirements of Oregon Structural Specialty Code, latest edition.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Acceptance at Site
 1. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
 - B. Storage
 1. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- 1.7 PROJECT/SITE CONDITIONS
- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.
- 1.8 WARRANTY
- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.1 BATT INSULATION MATERIALS

- A. Manufacturers
 1. Certainteed Corporation.
 2. Johns Manville.
 3. Knauf Insulation.
 4. Owens Corning Corp.
 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Description

1. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.
 2. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
 3. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
 4. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
 5. Formaldehyde Content: Zero.
 6. Facing: Unfaced.
- C. Extent and R-Value
1. Exterior Walls: R-21 at 6" stud walls and R-25 at 8" stud walls.

2.2 GLASS-FIBER BLANKET INSULATION

A. Description

1. Unfaced
 - a. Glass-Fiber Blanket Sound Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
2. Faced
 - a. Glass-Fiber Blanket Insulation: ASTM C 665, Type III, Class A (membrane-faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil-scrim-kraft, foil-scrim, or foil-scrim-polyethylene vapor-retarder membrane on 1 face.

B. Extent and R-Value

1. Fill cavity where insulation installed

2.3 SPRAY FOAM SURFACE INSULATION

A. Manufacturers

1. "Icynene LD-R-50" by Intertec.
2. "Froth-Pak" by Dow Chemical.
3. "Certa-Spray" by CertainTeed.
4. Substitutions: See Section 01 6000 – Product Requirements.

B. Description

1. Light density spray foam, open celled, flexible, all water blown polyurethane foam insulation meeting the requirements of ASTM C158, E283 and E84 (Flame spread <25 and Smoke developed <450).

C. Extent

1. As shown on the Drawings and as necessary to seal and fill gaps to building exterior.

2.4 ACCESSORIES

- A. Tape: Polyethylene self-adhering type, mesh reinforced, 2 inch wide, compatible with vapor retarder.
- B. Insulation Support Fasteners
 - 1. Insulation support system to adequately support glass-fiber blanket insulation from falling or sagging between metal studs and metal stud partitions. Roll type sheet metal in 100 ft. lengths with perforated prongs. Sheet metal strip screwed to studs at 24" oc. vertically with manufacturer approved fasteners. Design simplifies installation, and doubles as reinforcement strapping and meets federal specifications. Insulation is impaled on 2 1/2 in. arrow prongs which are on 8 in. centers.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions
 - 1. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation .

3.2 PREPARATION

- A. Clean substrates of substances harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.

3.3 INSTALLATION

- A. Installation – General
 - 1. Install insulation and vapor retarder in accordance with manufacturer's instructions.
 - 2. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.
 - 3. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
 - 4. For preformed insulating units, provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.
- B. Installation – General Building Insulation
 - 1. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
 - 2. Seal joints between foam-plastic insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.

3. Set vapor-retarder-faced units with vapor retarder to warm side of construction, unless otherwise indicated.
4. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.
5. Stuff glass-fiber loose-fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft.

C. Installation – Batt Insulation

1. Install in exterior wall spaces without gaps or voids. Do not compress insulation.
2. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
3. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
4. Tape or friction fit insulation batts in place.
5. Install vapor retarder in continuous sheets over the inside face of all exterior wall surfaces and at bottom of batt ceiling insulation. Lap and seal sheet retarder joints over framing member face.
6. Tape seal tears or cuts in vapor retarder.
7. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane. Tape seal in place.

D. Installation – Vapor Barriers

1. General: Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated. Extend vapor retarder to cover miscellaneous voids in insulated substrates including those filled with loose-fiber insulation.
2. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.
3. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarder.

3.4 PROTECTION

- A. Do not permit installed insulation or vapor barriers to be damaged prior to its concealment.
- B. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

SECTION 07 2500
WEATHER BARRIERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fully adhered air barrier at building envelope.
- B. Rainscreen and furring components.

1.2 RELATED REQUIREMENTS

- A. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures.
- B. Section 01 3000 – Administrative Requirements: Submittal review procedures.
- C. Section 01 6000 – Product Requirements: Substitution request procedures.
- D. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.
- E. Section 07 2100 - Thermal Insulation: Vapor retarder installed in conjunction with batt or blown insulation.
- F. Section 07 6200 - Sheet Metal Flashing and Trim: Metal flashings installed in conjunction with weather barriers.
- G. Section 07 9005 - Joint Sealers: Sealant materials and installation techniques.

1.3 REFERENCE STANDARDS

- A. AATCC Test Method 127 - Water Resistance: Hydrostatic Pressure Test; 2013.
- B. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2013.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2014.
- D. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.
- E. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.
- F. ICC-ES AC38 - Acceptance Criteria for Water-Resistive Barriers; ICC Evaluation Service, Inc.; 2013.
- G. ICC-ES AC148 - Acceptance Criteria for Flexible Flashing Materials; ICC Evaluation Service, Inc.; 2011.
- H. OSSC - Oregon Structural Specialty Code, latest edition.

1.4 DEFINITIONS

- A. Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.
- B. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to

adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.

1.5 SYSTEM DESCRIPTION

A. System Requirements – Weather Barrier Assemblies

1. Air Barrier:

- a. On outside surface of sheathing of exterior walls use air barrier sheet, self-adhesive type.

1.6 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data

1. Product Data: Provide data on material characteristics, performance criteria, and limitations.

C. Manufacturer's Instructions

1. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.

1.7 QUALITY ASSURANCE

A. Qualifications

1. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years of experience.

B. Pre-Installation Meetings

1. Hold a pre-installation conference, one week prior to start of weather barrier installation. Attendees shall include General Contractor, Architect, Weather Barrier Installer, Sheet Metal Installer, Owner's Representative, and Weather Barrier Manufacturer's Designated Representative.
2. Review all related project requirements and submittals, status of substrate work and preparation, areas of potential conflict and interface, availability of weather barrier assembly materials and components, installer's training requirements, equipment, facilities and

1.8 DELIVERY, STORAGE, AND HANDLING

A. Acceptance at Site

1. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.

B. Storage

1. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes.

1.9 PROJECT/SITE CONDITIONS

- A. Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.

1.10 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide manufacturer's standard 10 year material warranty for air barrier membrane materials, sealant, and flashing membranes.

PART 2 PRODUCTS

2.1 AIR BARRIER

- A. Product and Manufacturer – Basis of Design
 - 1. “Blueskin VP160” by Henry Company.
- B. Other Acceptable Products and Manufacturers
 - 1. “Perm-A-Barrier “ Grace Construction Products.
 - 2. Substitutions: See Section 01 6000 – Product Requirements.
- C. Description
 - 1. Air Permeance: 0.004 cubic feet per minute per square foot, maximum, when tested in accordance with ASTM E2178.
 - 2. Water Vapor Permeance: 10 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure A (desiccant method).
 - 3. Water Penetration Resistance Around Nails: Pass, when tested in accordance with ASTM D1970/D1970M (modified).
 - 4. Ultraviolet and Weathering Resistance: Approved in writing by manufacturer for maximum of 150 days weather exposure.
 - 5. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less (Class A), when tested in accordance with ASTM E84.
 - 6. Water Resistance: Comply with applicable water-resistive requirements of ICC-ES Acceptance Criteria AC38.

2.2 ACCESSORIES

- A. Flexible Flashing
 - 1. Sheathing fabric saturated with air barrier coating and complying with the applicable requirements of ICC-ES AC148.
 - 2. Flexible Flashing to be acceptable as compatible to the Air Barrier Sheet by the Air Barrier Sheet manufacturer.
- B. Sealants, Primers, Tapes, and Accessories for Sealing Weather Barrier and Sealing Weather Barrier to Adjacent Substrates.
 - 1. As specified elsewhere or as recommended by weather barrier manufacturer.
- C. Opening flashings, sill flashings, through-wall flashings, and transition membranes.
 - 1. Type compatible with air barrier material and part of manufacturer's approved assembly.

PART 3 EXECUTION

3.1 EXAMINATION

A. Site Verification of Conditions

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

3.2 PREPARATION

- #### **A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.**

3.3 INSTALLATION – AIR BARRIER

- #### **A. Install materials in accordance with manufacturer's instructions.**

- #### **B. Air Barriers: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.**

- #### **C. Apply sealants and adhesives within recommended application temperature ranges. Consult manufacturer if temperature is out of this range.**

- #### **D. Self-Adhesive Sheets:**

1. Prepare substrate in manner recommended by sheet manufacturer; fill and tape joints in substrate and between dissimilar materials.
2. Lap sheets shingle-fashion to shed water and seal laps air tight.
3. Once sheets are in place, press firmly into substrate with resilient hand roller; ensure that all laps are firmly adhered with no gaps or fishmouths.
4. Use same material, or other material approved by sheet manufacturer for the purpose, to seal to adjacent construction and as flashing.
5. Seal membrane terminations, heads of mechanical fasteners, around penetrations, piping, electrical and other apparatus extending through the water resistive air barrier.

- #### **E. Openings and Penetrations in Exterior Weather Barriers:**

1. Install assembly components as indicated on drawings and according to the following.
2. Install flashing over sills, covering entire sill frame member, extending at least 5 inches onto weather barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
3. At openings to be filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with at least 4 inches wide; do not seal sill flange.
4. At openings to be filled with non-flanged frames, seal weather barrier to all sides of opening framing, using flashing at least 9 inches wide, covering entire depth of framing.
5. At head of openings, install flashing under weather barrier extending at least 2 inches beyond face of jambs; seal weather barrier to flashing.
6. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.

7. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.

3.4 FIELD QUALITY CONTROL

A. Site Tests, Inspections

1. Do not cover installed weather barriers until required inspections have been completed.
2. C. Take digital photographs of each portion of the installation prior to covering up.

3.5 PROTECTION

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

END OF SECTION

SECTION 07 2500
WEATHER BARRIERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Mechanically attached air barrier at building envelope.
- B. Rainscreen and furring components.

1.2 RELATED REQUIREMENTS

- A. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures.
- B. Section 01 3000 – Administrative Requirements: Submittal review procedures.
- C. Section 01 6000 – Product Requirements: Substitution request procedures.
- D. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.
- E. Section 07 2100 - Thermal Insulation: Vapor retarder installed in conjunction with batt or blown insulation.
- F. Section 07 6200 - Sheet Metal Flashing and Trim: Metal flashings installed in conjunction with weather barriers.
- G. Section 07 9005 - Joint Sealers: Sealant materials and installation techniques.

1.3 REFERENCE STANDARDS

- A. AATCC Test Method 127 - Water Resistance: Hydrostatic Pressure Test; 2013.
- B. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2013.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2014.
- D. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.
- E. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.
- F. ICC-ES AC38 - Acceptance Criteria for Water-Resistive Barriers; ICC Evaluation Service, Inc.; 2013.
- G. ICC-ES AC148 - Acceptance Criteria for Flexible Flashing Materials; ICC Evaluation Service, Inc.; 2011.
- H. OSSC - Oregon Structural Specialty Code, latest edition.

1.4 DEFINITIONS

- A. Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.
- B. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to

adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.

1.5 SYSTEM DESCRIPTION

A. System Requirements – Weather Barrier Assemblies

1. Air Barrier:

- a. On outside surface of sheathing of exterior walls use air barrier sheet, self-adhesive type.

1.6 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data

1. Product Data: Provide data on material characteristics, performance criteria, and limitations.

C. Manufacturer's Instructions

1. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.

1.7 QUALITY ASSURANCE

A. Qualifications

1. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years of experience.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Acceptance at Site

1. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.

B. Storage

1. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes.

1.9 PROJECT/SITE CONDITIONS

- ### A. Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.

1.10 WARRANTY

- ### A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

- ### B. Provide manufacturer's standard 10 year material warranty for air barrier membrane materials, sealant, and flashing membranes.

PART 2 PRODUCTS

2.1 AIR BARRIER – MECHANICALLY FASTENED

- #### A. Product and Manufacturer – Basis of Design

1. "Tyvec Commercial Wrap" by a. DuPont Building Innovations.
- B. Other Acceptable Products and Manufacturers
 1. Substitutions: See Section 01 6000 – Product Requirements.
- C. Description
 1. Air Permeance: 0.004 cubic feet per minute per square foot, maximum, when tested in accordance with ASTM E2178.
 2. Water Vapor Permeance: 5 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure A (desiccant procedure).
 3. Water Penetration Resistance: Withstand a water head of 21 inches, minimum, for minimum of 5 hours, when tested in accordance with AATCC Test Method 127.
 4. Ultraviolet and Weathering Resistance: Approved in writing by manufacturer for minimum of 180 days weather exposure.
 5. Surface Burning Characteristics: Flame spread index of 25 or less, and smoke developed index of 50 or less, when tested in accordance with ASTM E84.
 6. Water Resistance: Comply with applicable water-resistive requirements of ICC-ES AC38.
 7. Seam and Perimeter Tape: Polyethylene self adhering type, mesh reinforced, 2 inches wide, compatible with sheet material; unless otherwise specified.

2.2 ACCESSORIES

- A. Flexible Flashing
 1. Sheathing fabric saturated with air barrier coating and complying with the applicable requirements of ICC-ES AC148.
 2. Flexible Flashing to be acceptable as compatible to the Air Barrier Sheet by the Air Barrier Sheet manufacturer.
- B. Sealants, Primers, Tapes, and Accessories for Sealing Weather Barrier and Sealing Weather Barrier to Adjacent Substrates.
 1. As specified elsewhere or as recommended by weather barrier manufacturer.
- C. Opening flashings, sill flashings, through-wall flashings, and transition membranes.
 1. Type compatible with air barrier material and part of manufacturer's approved assembly.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

3.3 INSTALLATION – AIR BARRIER GENERAL

- A. Install materials in accordance with manufacturer's instructions.

- B. Air Barriers: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- C. Apply sealants and adhesives within recommended application temperature ranges. Consult manufacturer if temperature is out of this range.
- D. Openings and Penetrations in Exterior Weather Barriers:
 - 1. Install assembly components as indicated on drawings and according to the following.
 - 2. Install flashing over sills, covering entire sill frame member, extending at least 5 inches onto weather barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
 - 3. At openings to be filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with at least 4 inches wide; do not seal sill flange.
 - 4. At openings to be filled with non-flanged frames, seal weather barrier to all sides of opening framing, using flashing at least 9 inches wide, covering entire depth of framing.
 - 5. At head of openings, install flashing under weather barrier extending at least 2 inches beyond face of jambs; seal weather barrier to flashing.
 - 6. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.
 - 7. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.

3.4 INSTALLATION – MECHANICALLY ATTACHED SHEETS

- A. Install sheets shingle-fashion to shed water, with seams generally horizontal.
- B. Overlap seams as recommended by manufacturer but at least 6 inches.
- C. Overlap at outside and inside corners as recommended by manufacturer but at least 12 inches.
- D. Attach to framed construction with fasteners extending through sheathing into framing. Space fasteners at 12 to 18 inches on center along each framing member supporting sheathing.
- E. For applications specified to be air tight, seal seams, laps, penetrations, tears, and cuts with self-adhesive tape; use only large-headed, gasketed fasteners recommended by the manufacturer.
- F. Where stud framing rests on concrete or masonry, extend lower edge of sheet at least 4 inches below bottom of framing and seal to foundation with sealant.
- G. Install air barrier and vapor retarder UNDER jamb flashings.
- H. Install head flashings under weather barrier.
- I. At openings to be filled with frames having nailing flanges, wrap excess sheet into opening; at head, seal sheet over flange and flashing.
- J. At each cladding anchor, apply 4 inch by 7 inch piece of Straight Flashing or weather barrier manufacturer approved alternate on top of weather barrier membrane prior to the installation of anchors.

3.5 FIELD QUALITY CONTROL

A. Site Tests, Inspections

1. Do not cover installed weather barriers until required inspections have been completed.
2. C. Take digital photographs of each portion of the installation prior to covering up.

3.6 PROTECTION

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

END OF SECTION

SECTION 07 4646
FIBER-CEMENT SIDING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Wood-fiber cement siding and soffit board and trim.
 - 1. Lap Siding

1.2 RELATED REQUIREMENTS

- A. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures.
- B. Section 01 3000 – Administrative Requirements: Submittal review procedures.
- C. Section 01 6000 – Product Requirements: Substitution request procedures.
- D. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.
- E. Section 06 1000 - Rough Carpentry: Siding substrate.
- F. Section 07 2500 - Weather Barriers: Weather barrier and rainscreen under siding.
- G. Section 07 9200 - Joint Sealers.

1.3 REFERENCE STANDARDS

- A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- B. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- C. ASTM C1186 - Standard Specification for Flat Fiber Cement Sheets; 2008 (Reapproved 2012).
- D. OSSC - Oregon Structural Specialty Code, latest edition.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data
- C. Submit manufacturer's product data with the following information.
 - 1. Manufacturer's requirements for related materials to be installed by others.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation methods, including nail patterns.

1.5 QUALITY ASSURANCE

- A. Qualifications
 - 1. Installer Qualifications: Company specializing in performing the work of this section with minimum three years of experience.

B. Regulatory Requirements

1. Comply with the applicable requirements of Oregon Structural Specialty Code, latest edition.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Acceptance at Site

1. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.

B. Storage

1. Store materials inside under water-proof cover and elevate above grade, on a flat surface.

1.7 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.1 PRODUCT GENERAL REQUIREMENTS

A. Manufacturer – Basis of Design

1. James Hardie Building Products, Inc

B. Other Acceptable Products and Manufacturers

1. a. CertainTeed Corporation
2. Substitutions: See Section 01 6000 – Product Requirements.

2.2 LAP SIDING

A. Product – Basis of Design

1. “Hardi-Plank”.

B. Dimensions

1. Length
 - a. 12 ft, nominal.
2. Width (Height)
 - a. 6 1/2 in. actual / 5 in. exposure.
3. Thickness
 - a. 5/16 in. nominal.

C. Description

1. Individual horizontal boards made of cement and cellulose fiber formed under high pressure with integral surface texture, complying with ASTM C1186 Type A Grade II; with machined edges, for nail attachment.

D. Characteristics

1. Texture: Smooth

- 2. Style: Standard lap style
 - E. Finishes
 - 1. Unfinished for field painting.
 - F. Warranty
 - a. 50 years, transferable
- 2.3 ACCESSORIES
- A. Trim:
 - 1. Same material and texture as siding.
 - B. Fasteners
 - 1. Stainless steel, ring shank; length as required to penetrate minimum 1-1/4 inch into framing member.
 - C. Mounting Block
 - 1. Fiber-cement mounting block with integral ABS flange.
 - 2. Type and size as required for size of penetration, light, vent, or outlet.
 - 3. Product
 - a. 'Sturdi-Mount' by Sturdi-Build.
 - b. Substitutions: See Section 01 6000 – Product Requirements.
 - D. Sealant
 - 1. Elastomeric, polyurethane or silyl-terminated polyether/polyurethane, and capable of being painted.
 - E. Joint Sealer: As specified in Section 07 9005.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions
 - 1. Verify WRB is installed over substrate completely and correctly, and reviewed by Architect prior to installation of siding.

3.2 INSTALLATION - GENERAL

- A. Install in accordance with manufacturer's instructions and recommendations.
 - 1. Read warranty and comply with all terms necessary to maintain warranty coverage.
 - 2. Install in accordance with conditions stated in model code evaluation report applicable to location of project.
 - 3. Use trim details indicated on drawings.
 - 4. Touch up all field cut edges before installing.
 - 5. Pre-drill nail holes if necessary to prevent breakage.

- B. Allow space for thermal movement between both ends of siding panels that butt against trim; seal joint between panel and trim with specified sealant.
- C. Joints in Horizontal Siding: Avoid joints in lap siding except at corners; where joints are inevitable stagger joints between successive courses.
- D. Joints in Vertical Siding: Install Z-flashing in horizontal joints between successive courses of vertical siding.
- E. Do not install siding less than 6 inches from surface of ground nor closer than 1 inch to roofs, patios, porches, and other surfaces where water may collect.
- F. After installation, seal all joints except lap joints of lap siding. Seal around all penetrations. Paint all exposed cut edges.
- G. Finish Painting: Specified in Section 09 9000.

3.3 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 07 6000

SHEET METAL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fabricated sheet metal items, including flashings, counterflashings, and other items indicated in Schedule.
- B. Sealants for joints within sheet metal fabrications.

1.2 RELATED REQUIREMENTS

- A. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures.
- B. Section 01 3000 – Administrative Requirements: Submittal review procedures.
- C. Section 01 6000 – Product Requirements: Substitution request procedures.
- D. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.
- E. Section 06 1000 - Rough Carpentry: Wood nailers for sheet metal work; field fabricated roof curbs.
- F. Section 07 9005 - Joint Sealers.
- G. Section 09 9000 - Painting and Coating: Field painting.

1.3 REFERENCE STANDARDS

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 2013.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- C. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).
- D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.
- E. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2009.
- F. ASTM D4479/D4479M - Standard Specification for Asphalt Roof Coatings - Asbestos-Free; 2007 (Reapproved 2012).
- G. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2012).
- H. CDA A4050 - Copper in Architecture - Handbook; latest edition.
- I. SMACNA (ASMM) - Architectural Sheet Metal Manual; latest edition.
- J. OSSC - Oregon Structural Specialty Code, latest edition.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings

1. Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

1.5 QUALITY ASSURANCE

A. Quality Standards

1. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

B. Qualifications

1. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years of experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Acceptance at Site

1. Deliver materials in original packages, containers or bundles bearing name and identification of supplier.

B. Storage

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

PART 2 PRODUCTS

2.1 SHEET MATERIALS

A. Galvanized Steel

1. ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage, (0.0239 inch) thick base metal.

B. Pre-Finished Galvanized Steel

1. ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage, (0.0239) inch thick base metal, shop pre-coated with PVDF coating.
2. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
3. Color: As scheduled.

C. Stainless Steel

1. ASTM A666 Type 304, soft temper, minimum 0.015 inch (26 ga) thick; smooth No. 4 finish. Fully annealed.

2.2 ACCESSORIES

A. Fasteners

1. Stainless steel, with soft neoprene washers.

B. Underlayment

1. Organic roofing felt, Type I ("No. 15").

- C. Slip Sheet
 - 1. Rosin sized building paper.
- D. Primer
 - 1. Zinc chromate type.
- E. Protective Backing Paint
 - 1. Asphaltic mastic, ASTM D4479 Type I.
- F. Sealant to be Concealed in Completed Work
 - 1. Non-curing butyl sealant.
- G. Sealant to be Exposed in Completed Work
 - 1. Elastomeric sealant, 100 percent silicone with minimum movement capability of plus/minus 25 percent and recommended by manufacturer for substrates to be sealed; clear.
- H. Sealant – Other
 - 1. Type as specified in Section 07 9005.
- I. Plastic Cement
 - 1. Type I.
- J. Solder
 - 1. Sn50 (50/50) type.
- K. Flux
 - 1. Rosin, cut Muriatic Acid, or commercial preparation suitable for use.

2.3 FABRICATION – GENERAL

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats of same material as sheet, minimum 2 in. wide, interlocking with sheet.
- C. Form pieces in longest possible lengths.
- D. Hem exposed edges on underside 1/2 in.; miter and seam corners.
- E. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- F. Fabricate corners from one piece with minimum 18 in. long legs; seam for rigidity, seal with sealant.
- G. Fabricate vertical faces with bottom edge formed outward 1/4 in. and hemmed to form drip.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions
 - 1. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

2. Verify roofing termination and base flashings are in place, sealed, and secure.
3. Verify that nailers and blocking are properly installed.

3.2 PREPARATION

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

3.3 INSTALLATION – GENERAL

- A. Conform to drawing details.
- B. Install Work watertight, without waves, warps, buckles, tool marks, fastening stresses, distortion, or defects which impair strength of mar appearance.
- C. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
- D. Apply plastic cement compound between metal flashings and felt flashings.
- E. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- F. Seal metal joints watertight.
- G. Install planes and lines in true alignment. Allow for sheet metal expansion and contraction.
- H. Secure elements in place using fasteners.

3.4 INSTALLATION – COPINGS

- A. Install copings with continuous cleat on the exterior side, fastened at 16 inches on center. Use exposed fasteners with neoprene washers through elongated holes on the roof side, at 24 inches on center.

3.5 SCHEDULES

- A. Coping, Counter-flashing, Cap, Parapet, Ledge Flashings, and other flashings note listed below.
 1. 24 gage pre-coated galvanized steel, unless otherwise indicated.
- B. Window and Door Openings
 1. 24 ga pre-coated sheet metal
- C. Flashings Associated with Shingle Roofing, including Valley, Hip, Ridge, Eave, Gutter Edge, Gable Edge.
 1. 24 ga pre-coated sheet metal
- D. Roofing Penetration Flashings, for Pipes, Structural Steel, and Equipment Supports.
 1. 24 gage galvanized steel, unless otherwise indicated.

END OF SECTION

SECTION 07 9200

JOINT SEALANT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sealant
- B. Joint backing
- C. Acoustical sealant

1.2 RELATED REQUIREMENTS

- A. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures.
- B. Section 01 3000 – Administrative Requirements: Submittal review procedures.
- C. Section 01 6000 – Product Requirements: Substitution request procedures.
- D. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.
- E. Section 07 2500 - Weather Barriers: Sealants required in conjunction with air barriers and vapor retarders:
- F. Section 08 8000 - Glazing: Glazing sealants and accessories.
- G. Section 09 2116 - Gypsum Board Assemblies: Acoustic sealant installation.

1.3 REFERENCE STANDARDS

- A. ASTM C834 - Standard Specification for Latex Sealants; 2010.
- B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.
- C. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.
- D. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data
 - 1. Submit manufacturer's product data and installation instructions.

1.5 QUALITY ASSURANCE

- A. Quality Standards
 - 1. Types
 - a. Type S – Single Component.
 - b. Type M – Multi-Component.
 - 2. Grades
 - a. Grade P – Pourable (self-leveling).

- b. Grade NS – Nosag.
- 3. Classes
 - a. Amount listed is percentage relative to original joint width.
- 4. Uses
 - a. Use T – Traffic.
 - b. Use NT – Nontraffic.
 - c. Use I – Immersible.
 - d. Use M – in contact with mortar.
 - e. Use G – in contact with glass.
 - f. Use A – in contact with aluminum.
 - g. Use 0 – in contact with other materials than listed above.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Storage

- 1. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes.

1.7 PROJECT/SITE CONDITIONS

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. BASF Construction Chemicals-Building Systems.
- B. Bostik Inc.
- C. Dow Corning Corporation.
- D. Momentive Performance Materials, Inc (formerly GE Silicones).
- E. Pecora Corporation.
- F. Tremco Global Sealants.
- G. Substitutions: See Section 01 6000 - Product Requirements. Products listed below are one acceptable product. Other products from the manufacturers listed above meeting the requirements below are acceptable.

2.2 SEALANTS

A. General

- 1. Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.
- 2. Color: To be selected by Architect from manufacturer's standard range.

B. General Purpose Exterior Sealant

1. Description

- a. Polyurethane; ASTM C920, Grade NS, Class 25 minimum; Uses M, G, and A; single component.

2. Product

- a. "NP2" by Soneborn.

3. Applications: Use for:

- a. Control, expansion, and soft joints in masonry.
- b. Joints between concrete and other materials.
- c. Joints between metal frames and other materials.
- d. Other exterior joints for which no other sealant is indicated.

C. General Purpose Interior Sealant

1. Description

- a. Acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable.

2. Product

- a. "Sonolac" Sonneborn.

3. Applications: Use for:

- a. Interior wall and ceiling control joints.
- b. Joints between door and window frames and wall surfaces.
- c. Other interior joints for which no other type of sealant is indicated.

D. Plumbing/Tile Sealant

1. Description

- a. White silicone; ASTM C920, Uses I, M and A; single component, mildew resistant.

2. Product

- a. "Omniplus" by Sonneborn.

3. Applications: Use for:

- a. Joints between plumbing fixtures and floor and wall surfaces.
- b. Joints between kitchen and bath countertops and wall surfaces.

E. Acoustical Joint Sealant

1. Description

- a. Latex; ASTM C834; Grade NS, Uses O; Single component.

2. Product

- a. "AIS-919" by Pecora.

- 3. Applications: Use for:
 - a. Joints in interior assemblies to reduce airborne sound transmission.

2.3 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.
- E. Masonry Sand: Mason's Sand and Silica Mix for use over still wet sealant at all masonry control or expansion joints. Sand to closely match color and texture of mortar joints.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions
 - 1. Verify that substrate surfaces are ready to receive work.
 - 2. Verify that joint backing and release tapes are compatible with sealant.

3.2 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement.

3.3 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- D. Install bond breaker where joint backing is not used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- G. Tool joints concave. Remove and replace sealant in joints improperly tooled.
- H. Spread Mason's Sand and Silica Mix over still wet sealant at all control joints in masonry walls.

3.4 CLEANING

- A. Clean adjacent soiled surfaces.

3.5 PROTECTION

- A. Protect sealants until cured.

END OF SECTION

SECTION 08 1100
METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Non-fire-rated steel doors and frames.
- B. Steel frames for wood doors.
- C. Sound-rated steel doors and frames.
- D. Steel glazing frames.
- E. Accessories, including glazing.

1.2 RELATED REQUIREMENTS

- A. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures.
- B. Section 01 3000 – Administrative Requirements: Submittal review procedures.
- C. Section 01 6000 – Product Requirements: Substitution request procedures.
- D. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.
- E. Section 08 1416 - Flush Wood Doors.
- F. Section 08 7100 - Door Hardware.
- G. Section 08 8000 - Glazing: Glass for doors and borrowed lites.
- H. Section 09 9000 – Painting and Coating: Field painting.

1.3 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.
- C. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2013.
- E. ASTM C1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus; 2011.
- F. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.
- G. ASTM E413 - Classification for Rating Sound Insulation; 2010.
- H. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2014. (ANSI/BHMA A156.115)
- I. ICC A117.1 - Accessible and Usable Buildings and Facilities; International Code Council; 2009 (ANSI).

- J. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; 2007.
- K. OSSC - Oregon Structural Specialty Code, latest edition.

1.4 SYSTEM DESCRIPTION

A. Design Requirements

- 1. It is the intent of this specification to provide a general guideline for the quality, function, and design of the hollow metal doors, frames, and windows. It is the specific responsibility of the hollow steel supplier to furnish products which are fully functional, in full compliance with state and local building codes, fire codes, and disability and accessibility codes. Any supplier bidding on this section of the work shall notify the Architect prior to bidding, in accordance with Instructions to Bidders, of discrepancies or will be assumed to have included correct material to make this compliance.

B. System Requirements

- 1. To provide a higher level of coordination the following building materials must be provided by the same sub-contractor.
 - a. 08 1113 - Metal Doors and Frames
 - b. 08 1416 - Flush Wood Doors
 - c. 08 7100 - Door Hardware

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data

- 1. Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.

C. Shop Drawings

- 1. Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.

D. Manufacturer's Instructions

- 1. Manufacturer's published instructions, including any special installation instructions relating to this project.

1.6 QUALITY ASSURANCE

A. Qualifications

- 1. The steel door and frame supplier shall be a manufacturer or distributor regularly engaged in supplying hollow metal products in this geographic area who has competent field personnel available to consult with the Architect and Contractor regarding applications or field installation problems.
- 2. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

3. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years of experience.

B. Regulatory Requirements

1. Comply with the applicable requirements of Oregon Structural Specialty Code, latest edition.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Acceptance at Site

1. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.

B. Storage

1. Store in accordance with NAAMM HMMA 840.
2. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.1 PRODUCT GENERAL REQUIREMENTS

A. Requirements for All Doors and Frames:

1. Accessibility: Comply with ICC A117.1 and ADA Standards.
2. Door Edge Profile: Beveled on both edges.
3. Door Texture: Smooth faces.
4. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
5. Hardware Preparation: In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
6. Finish: Factory primed, for field finishing.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

C. Manufacturers

1. Assa Abloy Ceco or Curries.
2. Republic Doors: [www](http://www.republicdoors.com).
3. Steelcraft, an Allegion brand.
4. Substitutions: See Section 01 6000 - Product Requirements.

2.2 STEEL DOORS

A. Exterior Doors

1. Description
 - a. Grade: ANSI/SDI A250.8 (SDI-100); Level 1 - Standard-Duty, Physical Performance Level C, Model 1 - Full Flush.
 - b. Core: Manufacturer's standard to achieve R-value.
 - c. Top Closures for Outswinging Doors: Flush with top of faces and edges.
 - d. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating.
 - e. Insulating Value: U-value of 0.50, when tested in accordance with ASTM C1363.
2. Dimensions
 - a. Steel Thickness: 16 gage.
 - b. Thickness: 1-3/4 inch.

B. Interior Doors

1. Description
 - a. Grade: ANSI/SDI A250.8 (SDI-100); Level 1 - Standard-Duty, Physical Performance Level C, Model 1 - Full Flush.
2. Dimensions
 - a. Steel Thickness: 16 gage.
 - b. Thickness: 1-3/4 inch.

C. Interior Doors, Sound Rated

1. Description
 - a. Grade: ANSI/SDI A250.8 (SDI-100); Level 1 - Standard-Duty, Physical Performance Level C, Model 2 - Seamless.
 - b. Acoustic Rating of Assembled Door, Frame, and Seals: STC of 35, calculated in accordance with ASTM E413, tested in accordance with ASTM E90.
 - c. Sound Seals: Integral, concealed in door and/or frame.
 - d. Force to Open and Close and Latch: Not more than 5 lbs.
2. Dimensions
 - a. Steel Thickness: 16 gage.
 - b. Thickness: 1-3/4 inch.

2.3 STEEL FRAMES

A. Requirements – General

1. Comply with the requirements of grade specified for corresponding door.
2. Finish: Factory primed, for field finishing.
3. Fully weld unless noted otherwise in Other Requirements.
4. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.

5. Anchor: Provide anchor recommended by the frame manufacturer for the wall construction application that each frame will be located in.
- B. Exterior Door Frames
 1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A60/ZF180 coating.
 - C. Other Requirements
 1. Frames for Interior Glazing or Borrowed Lights
 - a. Construction and face dimensions to match door frames, and as indicated on drawings.
- 2.4 ACCESSORIES
- A. Glazing
 1. As specified in Section 08 8000 - Glazing.
 - B. Removable Stops in steel window frames
 1. Formed sheet steel, shape as indicated on drawings, mitered or butted corners; prepared for countersink style tamper proof screws.
 - C. Removeable stops in non-fire rated steel doors
 1. Square vision light steel stops. 18 gage cold rolled steel frame with mitered and welded corners, prepared countersunk style tamper proof screws.
 2. Products and Manufacturers
 - a. "Model VLF1G" by Air Louvers, Inc.
 - b. Substitutions: See Section 01 6000 – Product Requirements.
 3. Finish
 - a. Exterior Doors - Electro-galvanize and prime painted
 - b. Interior Doors - Powder coated prime paint for field finishing with doors.
 - D. Thermal Batt Insulation
 1. As specified in Section 07 2100.
 - E. Temporary Frame Spreaders
 1. Provide for all factory- or shop-assembled frames.
- 2.5 FINISHES
- A. Primer
 1. Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
 - B. Bituminous Coating
 1. Asphalt emulsion or other high-build, water-resistant, resilient coating.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions
 - 1. Verify existing conditions before starting work.
 - 2. Verify that opening sizes and tolerances are acceptable.
- 3.2 PREPARATION
 - A. Coat inside of frames with bituminous coating to a thickness of 1/16 inch.
- 3.3 INSTALLATION
 - A. Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.
 - B. Coordinate frame anchor placement with wall construction.
 - C. Fill frame cavities of exterior and sound rated doors with thermal batt insulation.
 - D. Coordinate installation of hardware.
 - E. Coordinate installation of glazing.
 - F. Coordinate installation of electrical connections to electrical hardware items.
 - G. Touch up damaged factory finishes.
- 3.4 FIELD QUALITY CONTROL
 - A. Tolerances
 - 1. Clearances Between Door and Frame: As indicated in ANSI/SDI A250.8(SDI-100).
 - 2. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.
 - B. Adjusting
 - 1. Adjust for smooth and balanced door movement.
 - 2. Adjust sound control doors so that seals are fully engaged when door is closed.

END OF SECTION

SECTION 08 1416
FLUSH WOOD DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

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

1.2 RELATED REQUIREMENTS

- A. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures.
- B. Section 01 3000 – Administrative Requirements: Submittal review procedures.
- C. Section 01 6000 – Product Requirements: Substitution request procedures.
- D. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.
- E. Section 08 1113 - Hollow Metal Doors and Frames.
- F. Section 08 7100 - Door Hardware.
- G. Section 08 8000 - Glazing.
- H. Section 09 9000 – Painting and Coating: Field finishing of doors.

1.3 REFERENCE STANDARDS

- A. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.
- B. ASTM E413 - Classification for Rating Sound Insulation; 2010.
- C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.
- D. OSSC - Oregon Structural Specialty Code, latest edition.

1.4 SYSTEM DESCRIPTION

- A. System Requirements
 - 1. To provide a higher level of coordination the following building materials must be provided by the same sub-contractor.
 - a. 08 1113 - Hollow Metal Doors and Frames
 - b. 08 1416 - Flush Wood Doors
 - c. 08 7100 - Door Hardware

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data
 - 1. Submit manufacturer's product data and installation instructions.
 - 2. Indicate door core materials and construction, veneer species, louver, lite kit frame, type and characteristics.

- C. Shop Drawings
 - 1. Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
- D. Samples
 - 1. Purpose: Factory finishes applied to actual door face materials.
 - 2. Quantity: (2)
 - 3. Size: 6 in. x 6 in.
- E. Quality Assurance Submittals
 - 1. Design data/test reports. Show compliance with specified requirements for the following:
 - a. Sound-retardant doors and frames; sealed panel tests are not acceptable.

1.6 QUALITY ASSURANCE

- A. Qualifications
 - 1. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Regulatory Requirements
 - 1. Comply with the applicable requirements of Oregon Structural Specialty Code, latest edition.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Acceptance at Site
 - 1. Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.
 - 2. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
 - 3. Package, deliver and store doors in accordance with specified quality standard.
 - 4. Accept doors on site in manufacturer's packaging. Inspect for damage.
 - 5. Mark each door on top rail with opening number used on Shop Drawings.
- B. Storage
 - 1. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

1.8 WARRANTY

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

- C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.
 - 1. Warping (bow, cup, or twist) more than 1/4 in. in a 42-by-84-in. section.
 - 2. Telegraphing of core construction in face veneers exceeding 0.01 in. in a 3-in. span.

PART 2 PRODUCTS

2.1 PRODUCT GENERAL REQUIREMENTS

- A. All Doors
 - 1. Quality Level: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS).
 - 2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
 - 3. See drawings for locations and additional requirements.
- B. Interior Doors
 - 1. 1-3/4 inches thick unless otherwise indicated; flush construction.
 - 2. Provide solid core doors at all locations.
 - 3. Sound Retardant Doors: Minimum STC of 41, calculated in accordance with ASTM E413, tested in accordance with ASTM E90.
 - 4. Wood veneer facing for field opaque finish .
- C. Fire-Rated Wood Doors
 - 1. Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
- D. Smoke- and Draft-Control Door Assemblies
 - 1. Listed and labeled for smoke and draft control, based on testing according to UL 1784.
- E. Product and Manufacturer
 - 1. Algoma.
 - 2. Eggers Industries.
 - 3. Haley Brothers.
 - 4. Marshfield DoorSystems, Inc.
 - 5. Vancouver Architectural Doors.
 - 6. VT Industries.
 - 7. Western Oregon Door.
 - 8. Substitutions: See Section 01 6000 – Product Requirements.

2.2 DOOR AND PANEL CORES

- A. Non-Rated Solid Core and 20 Minute Rated Doors
 - 1. Type particleboard core (PC), plies and faces as indicated.

- B. Sound Resistant Doors
 - 1. Equivalent to Type particleboard core (PC) construction with core as required to achieve STC rating specified; plies and faces as indicated.
- 2.3 DOOR FACINGS
 - A. Veneer Facing for Opaque Finish
 - 1. Medium density overlay (MDO).
 - B. Facing Adhesive
 - 1. Type I - waterproof.
- 2.4 ACCESSORIES
 - A. Glazing Stops
 - 1. Wood, of same species as door facing, mitered corners; prepared for countersink style tamper proof screws.
 - B. Removable stops in non-fire rated wood doors
 - 1. Square vision light steel stops. 18 gage cold rolled steel frame with mitered and welded corners, prepared countersunk style tamper proof screws.
 - 2. Products and Manufacturers
 - a. "Model VLF1G" by Air Louvers, Inc.
 - b. Substitutions: See Section 01 6000 – Product Requirements.
 - 3. Finish
 - a. Powder coated prime paint for field finishing.
- 2.5 DOOR CONSTRUCTION
 - A. Fabricate doors in accordance with door quality standard specified.
 - B. Cores Constructed with stiles and rails:
 - 1. Provide solid blocks at lock edge for hardware reinforcement.
 - 2. Provide solid blocking for other thru-bolted hardware.
 - C. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
 - D. Provide edge clearances in accordance with the quality standard specified.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions
 - 1. Verify that opening sizes and tolerances are acceptable.
 - 2. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.2 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
- B. Use machine tools to cut or drill for hardware.
- C. Coordinate installation of doors with installation of frames and hardware.
- D. Coordinate installation of glazing.
- E. Install door louvers plumb and level.
- F. Protect veneer from damage during construction. Do not wedge open doors with any material that might cause the veneer to split or chip.

3.3 FIELD QUALITY CONTROL

- A. Tolerances
 - 1. Conform to specified quality standard for fit and clearance tolerances.
 - 2. Conform to specified quality standard for telegraphing, warp, and squareness.
- B. Adjusting
 - 1. Adjust doors for smooth and balanced door movement.
 - 2. Adjust closers for full closure.

END OF SECTION

SECTION 08 3100
ACCESS DOORS AND PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Wall access door and frame units.

1.2 RELATED REQUIREMENTS

- A. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures.
- B. Section 01 3000 – Administrative Requirements: Submittal review procedures.
- C. Section 01 6000 – Product Requirements: Substitution request procedures.
- D. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.
- E. Section 09 2116 – Gypsum Board Assemblies

1.3 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data
 - 1. Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
- C. Manufacturer's Instructions
 - 1. Indicate installation requirements.

1.4 QUALITY ASSURANCE

- A. Qualifications
 - 1. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Acceptance at Site
 - 1. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
- B. Storage
 - 1. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes.

PART 2 PRODUCTS

2.1 PRODUCT GENERAL REQUIREMENTS

- A. Product and Manufacturer – Basis of Design

1. Products as listed by Acudor Products Inc.
- B. Other Acceptable Products and Manufacturers
 1. Babcock-Davis.
 2. Barco Manufacturing.
 3. Cierra Products.
 4. Dur-Red Products.
 5. Karp Associates, Inc.
 6. Milcor, Inc.
 7. Substitutions: See Section 01 6000 – Product Requirements.

2.2 WALL-MOUNTED UNITS

- A. Description
 1. Material
 - a. Steel.
 2. Finish
 - a. Stainless Steel.
 3. Door/Panel
 - a. Continuous, concealed hinge, standard duty, with tool-operated spring or cam lock and no handle.
 - b. Tool-operated spring or cam lock; no handle.
 4. Wall Mounting Criteria
 - a. Provide surface-mounted face frame and door surface flush with frame surface.
- B. Dimensions
 1. 12 in. by 16 in.
- C. Product
 1. "UF-5000" by Acudor

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that rough openings are correctly sized and located.

3.2 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in openings, and secure units rigidly in place.
- C. Position units to provide convenient access to concealed equipment when necessary.

END OF SECTION

SECTION 08 5413
FIBERGLASS WINDOWS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Factory fabricated fiberglass windows with fixed and operating sash.
- B. Factory glazed including infill panels.
- C. Operating hardware.
- D. Insect screens.
- E. Perimeter sealant.

1.2 RELATED REQUIREMENTS

- A. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures.
- B. Section 01 3000 – Administrative Requirements: Submittal review procedures.
- C. Section 01 6000 – Product Requirements: Substitution request procedures.
- D. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.
- E. Section 07 2500 - Weather Barriers: Sealing frames to weather barrier installed on adjacent construction.
- F. Section 07 9200 - Joint Sealers: Perimeter sealant and back-up materials.
- G. Section 08 8000 - Glazing.

1.3 REFERENCE STANDARDS

- A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for windows, doors, and skylights; 2011.
- B. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference; 2015.
- C. FS L-S-125 - Screening, Insect, Nonmetallic; Revision B, 1972.
- D. OSSC - Oregon Structural Specialty Code, latest edition.

1.4 SYSTEM DESCRIPTION

- A. Performance Requirements
 - 1. AAMA/WDMA/CSA 101/I.S.2/A440 requirements for specific window type:
 - a. Performance Class (PC): R.
 - 2. Design Pressure (DP): In accordance with applicable codes.
 - 3. Movement
 - a. Accommodate movement between window and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.

4. System Internal Drainage
 - a. Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
5. Thermal Movement
 - a. Design to accommodate thermal movement caused by 100 degrees F temperature change without buckling stress on glass, joint seal failure, damaging loads on structural elements, damaging loads on fasteners, reduction in performance or other detrimental effects.
6. Deflection
 - a. Limit member deflection to 1/200 of the longer dimension with full recovery of glazing materials.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data
 1. Provide component dimensions, anchors, fasteners, glass, and internal drainage details.
- C. Shop Drawings
 1. Indicate opening dimensions, framed opening tolerances, affected related work, installation requirements.
- D. Samples
 1. Purpose: Operating hardware.
 2. Quantity: (2)
 3. Size: Actual size.
- E. Quality Assurance Submittals
 1. Certificates – Submit one of the following:
 - a. Evidence of AAMA Certification.
 - b. Evidence of WDMA Certification.
 - c. Evidence of CSA Certification.
 2. Closeout Submittals
 - a. Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

- A. Qualifications
 1. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years of experience.
 2. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

- B. Regulatory Requirements
 - 1. Comply with the applicable requirements of Oregon Structural Specialty Code, latest edition.
- C. Pre-Installation Meetings
 - 1. Convene one week week before starting work of this section.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Jig, brace, and box the window frame assemblies for transport to minimize flexing of members or joints.
- B. Acceptance at Site
 - 1. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
 - 2. Protect finished surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.
- C. Storage
 - 1. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes.

1.8 PROJECT/SITE CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F.
- B. Maintain this minimum temperature during and after installation of sealants.

1.9 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a 10 year period after Date of Substantial Completion.
- C. Provide 10 year manufacturer warranty for defects in manufacturing, materials, and workmanship.
- D. Provide 20 year manufacturer warranty for insulated glass units from seal failure, inter-pane dusting or misting, and replacement of same. Include coverage for degradation of color finish.

PART 2 PRODUCTS

2.1 FIBERGLASS WINDOWS

- A. Product and Manufacturer – Basis of Design
 - 1. “Ultra Series” by Milgard.
- B. Other Acceptable Products and Manufacturers
 - 1. Substitutions: See Section 01 6000 – Product Requirements.
- C. Dimensions and Configuration
 - 1. See Drawings

D. Description

1. Hollow, tubular, multi-layer fiber reinforced material; factory fabricated; with vision glass, related flashings, anchorage and attachment devices.

E. Components

1. Frames

- a. Manufacturer's standard frame of this product line; flush glass stops of screw fastened type.
- b. Type: Nailing flange (for new windows).

2. Sills

- a. Composite fiberglass; sloped for positive wash; fit under sash to 1/2 inch beyond wall face.
- b. One piece full width of opening.

3. Stools

- a. Metal clad wood; fit under sash to project 1/2 inch beyond interior wall face.
- b. One piece full width of opening.

4. Jamb Extension

- a. Furnish factory jamb extension, as needed to fill depth of the wall opening.

5. Insect Screen Frame

- a. Rolled aluminum frame of rectangular sections; fit with adjustable hardware; nominal size similar to operable glazed unit.

6. Insect Screens

- a. FS L-S-125, woven plastic mesh; 14/18 mesh size.
- b. Color: Black.

7. Operable Sash Weather Stripping

- a. Wool pile; permanently resilient, profiled to effect weather seal.

8. Weather strip

- a. Sill weather strip is foam filled vinyl bulb. The bottom sash is sealed to the jambs using rigid vinyl with flexible seals. The top stationary sash seal is foam tape. The checkrails are sealed using rigid vinyl with flexible seals.

9. Fasteners

- a. Stainless steel.

10. Sealant for Setting Sills and Sill Flashing

- a. Non-curing butyl type.

F. Finishes

1. Exterior: Bark or Black Bean
2. Interior: White

2.2 GLASS AND GLAZING MATERIALS

- A. Glass and Glazing Materials: As specified in Section 08 8000.

2.3 SEALANT MATERIALS

- A. Glazing Sealant: Type as specified in Section 08 8000.

2.4 HARDWARE

- A. Casement and Awning Sash
 - 1. Zinc die-cast steel worm-gear operator with Painted finish.
- B. Operator Linkage, Hinge Slide, and Hinge Arms
 - 1. 300 series stainless steel.
- C. Casement and Awning Sash Lock
 - 1. Folding arm crank.
- D. Finish For Exposed Hardware
 - 1. Match window finish.

2.5 FABRICATION

- A. Fabricate framing, mullions and sash members with fusion welded corners and joints, in a rigid jig. Supplement frame sections with internal reinforcement where required for structural rigidity.
- B. Form sills and stools in one piece. Slope sills for wash.
- C. Form snap-in glass stops, closure molds, weather stops, and flashings for tight fit into window frame section.
- D. Form weather stop flange to perimeter of unit.
- E. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- F. Arrange fasteners to be concealed from view.
- G. Permit internal drainage weep holes and channels to migrate moisture to exterior. Provide internal drainage of glazing spaces to exterior through weep holes.
- H. Assemble insect screen frame, miter and reinforced frame corners. Fit mesh taut into frame and secure. Fit frame with four spring loaded steel pin retainers.
- I. Double weatherstrip operable units.
- J. Factory glaze window units.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions.
- B. Verify wall openings and adjoining air and vapor seal materials are ready to receive work of this Section.

3.2 INSTALLATION

- A. Install windows in accordance with manufacturer's instructions.
- B. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.
- C. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.
- D. Install sill.
- E. Set sill members and sill flashing in continuous bead of sealant.
- F. Coordinate attachment and seal of perimeter air and vapor barrier materials.
- G. Coordinate attachment and seal of perimeter air and vapor barrier materials.
- H. Install operating hardware.
- I. Install glass and infill panels in accordance with Section 08 8000, to glazing method required to achieve performance criteria.
- J. Install perimeter sealant and backing materials in accordance with Section 079200.

3.3 FIELD QUALITY CONTROL

- A. Tolerances
 - 1. Maximum Variation from Level or Plumb: 0.06 inches every 3 ft non-cumulative or 0.5 inches per 100 ft, whichever is less.
- B. Site Tests, Inspections
 - 1. Test installed windows for compliance with performance requirements for water penetration, in accordance with ASTM E1105 using uniform pressure and same pressure difference as specified for laboratory tests.
 - a. Test 5 percent of installed windows.
 - b. If any window fails, test additional windows at Contractor's expense.
 - c. Replace windows that have failed field testing and retest until performance is satisfactory.

3.4 CLEANING

- A. Remove protective material from pre-finished surfaces.
- B. Wash surfaces by method recommended and acceptable to window manufacturer, rinse and wipe surfaces clean.

END OF SECTION

SECTION 08 6223
TUBULAR SKYLIGHTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Rigid tubular skylights

1.2 RELATED REQUIREMENTS

- A. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures.
- B. Section 01 3000 – Administrative Requirements: Submittal review procedures.
- C. Section 01 6000 – Product Requirements: Substitution request procedures.
- D. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.
- E. Section 07 600 – Sheet Metal: Flashings

1.3 REFERENCE STANDARDS

- A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/ Specification for Windows, Doors, and Skylights (NAFS)
- B. CSA A440S1-09 – Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440
- C. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems
- D. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels
- E. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
- F. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
- G. ASTM E 408 - Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques
- H. ASTM E 1651 - Standard Test Method for Total Luminous Reflectance Factor by Use of 30/t Integrating-Sphere Geometry
- I. ASTM E 1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
- J. NFRC 100 - Procedure for Determining Fenestration Product U-factors.
- K. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.
- L. OSSC - Oregon Structural Specialty Code, latest edition.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data

1. Provide standard construction details, product performance characteristics, and material descriptions, dimensions of individual components and profiles, and finishes.

1.5 QUALITY ASSURANCE

A. Qualifications

1. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years of experience.
2. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Acceptance at Site

1. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.

B. Storage

1. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes.

1.7 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Manufacturer's standard form in which manufacturer agrees to repair or replace components of tubular unit skylights that fail in materials or workmanship under normal use within specified warranty period.
- C. Failures include, but are not limited to, the following:
 1. Deterioration of metals, metal finishes, dome, and other materials beyond normal weathering.
 2. Breakage of glazing.
- D. Warranty Period
 1. Tubular Unit Skylight Assembly: 10 years.
 2. Tunnel Reflective Coating: 20 years.

PART 2 PRODUCTS

2.1 TUBULAR SKYLIGHT

- A. Product and Manufacturer – Basis of Design
 1. “Sun Tunnel Skylight Kit Model TMR (pitched roof application)” by Velux
- B. Other Acceptable Products and Manufacturers
 1. Substitutions: See Section 01 6000 – Product Requirements.
- C. Dimensions

1. Dome: 14 in. diameter.
 2. Tube: As required for installation
- D. Description
1. Tubular unit skylight daylighting kits with exterior glazed opening, glazing retainers and gaskets, exterior flashing assembly with integral adjustable pivot device, reflective tunnel, interior diffuser assemblies, and accessories, as required to meet installation and performance requirements indicated.
- E. Components
1. Dome
 - a. Transparent, UV-resistant plastic dome.
 - b. Seal: Adhesive-backed foam weatherstrip.
 2. Glazing
 - a. 0.125 in. minimum thickness injection molded transparent impact modified acrylic material; with UV-absorbing additive.
 3. Dome Flashing Assembly:
 - a. Self-flashed Configuration: One-piece formed, 14 to 60 deg. roof pitch.
 - b. Material: Galvanized steel sheet, 24-ga.
 4. Reflective Tunnels
 - a. Rigid Reflective Tunnel: Skylight light shaft formed from anodized aluminum sheet, 0.016 inch/26-ga. (0.41-mm-) thick, with silver specular interior finish surface coated with vacuum-evaporated silicone oxide and titanium oxide protective surface.
 - b. Length: 24 in. Provide extension(s) as required for installation.
 - c. Reflectance: 99 percent reflectance when measured in accordance with ASTM E 1651 at 30 degrees from vertical. Total reflectance greater than 98 percent when measured in accordance with ASTM E 1651.
 5. Rigid Tunnel Components:
 - a. Rigid Tunnel Extension: One reflective tunnel, 24 inch length.
 - b. Universal Reflective Elbows: Two reflective angle adaptors adjustable to 45 degrees, 11.5 in. length, 24 ga. thick, and mounted at the top, middle, or bottom of reflective tunnel assemblies as required for application.
 6. Diffusers
 - a. Round ceiling diffuser assembly attached directly to bottom of reflective tunnel, with dual high visible light transmittance lenses separated by airtight seals providing insulating airspace, and paintable white acrylic trim ring.
 - b. Size: As required for flashing assembly indicated.
 - c. Lens Type: Crackle lens above frosted lens, minimum 92 percent visible light transmittance.
 7. Diffuser Accessories:

- a. Prismatic lens, minimum 92 percent visible light transmittance
- F. Accessories
 - 1. As required for complete installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions
 - 1. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 2. Proceed with tubular unit skylight installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install tubular unit skylights in accordance with manufacturer's written instructions and approved shop drawings. Coordinate installation of units with installation of substrates, air and vapor retarders, roof insulation, roofing membrane, and flashing as required to ensure that each element of the Work performs properly and that finished installation is weathertight.
 - 1. Anchor tubular unit skylights securely to supporting substrates.
 - 2. For horizontal installation, install tubular unit skylights true to line and without distortion.
 - 3. For sloped roof installation, install tubular unit skylights on curbs specified in another section with tops of curbs parallel to finished roof slope.
- B. Where metal surfaces of tubular unit skylights will contact incompatible metal or corrosive substrates, including preservative-treated wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation recommended in writing by tubular unit skylight manufacturer.
- C. Install tubular unit skylight curb counter flashing to produce weatherproof seal with curb and overlap with roofing system termination at top of curb.

3.3 CLEANING

- A. Clean exposed tubular unit skylight surfaces according to manufacturer's written instructions. Touch up damaged metal coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

END OF SECTION

SECTION 08 7100
DOOR HARDWARE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Hardware for wood, hollow steel, and aluminum doors.

1.2 RELATED REQUIREMENTS

- A. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures.
- B. Section 01 3000 – Administrative Requirements: Submittal review procedures.
- C. Section 01 6000 – Product Requirements: Substitution request procedures.
- D. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.
- E. Section 08 0607 - Door Hardware Schedule.
- F. Section 08 1113 - Metal Doors And Frames.
- G. Section 08 1416 - Flush Wood Doors.

1.3 REFERENCE STANDARDS

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- C. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames; Door and Hardware Institute; 2004.
- D. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Flush Wood Doors; Door and Hardware Institute; 1993; also in WDHS-1/WDHS-5 Series, 1996.
- E. ICC A117.1 - Accessible and Usable Buildings and Facilities; International Code Council; 2009 (ANSI).
- F. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2013.
- G. NFPA 101 - Life Safety Code; National Fire Protection Association; 2012.
- H. OSSC - Oregon Structural Specialty Code, latest edition.
- I. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

1.4 SYSTEM DESCRIPTION

- A. Performance Requirements
 - 1. Provide products that comply with the following:
 - a. Applicable provisions of federal, state, and local codes.
 - b. Accessibility: ADA Standards and ICC A117.1.
 - c. ANSI/ICC A117.1, American National Standard for Accessible and Usable Buildings and Facilities.
 - d. Applicable provisions of NFPA 101, Life Safety Code.

- e. Fire-Rated Doors: NFPA 80.
- f. Hardware on Fire-Rated Doors, Except Hinges: Listed and classified by UL as suitable for the purpose specified and indicated.
- g. Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose specified and indicated.

B. System Requirements

1. This specification is intended as a guideline for quality and operation and is not to be construed as a complete list. It is the specific responsibility of the hardware supplier to furnish complete hardware for all openings that is functional, meets the described intended use, and in full compliance with all state and local building codes, fire codes, and accessibility codes. Any supplier bidding on this section of the work shall notify the Architect prior to bidding, of discrepancies or will be assumed to have included correct material to make this compliance.
2. To provide a higher level of coordination the following building materials must be provided by the same sub-contractor.
 - a. 08 1113 - Metal Doors and Frames
 - b. 08 1416 - Flush Wood Doors
 - c. 08 7100 - Door Hardware
3. Coordinate the manufacture, fabrication, and installation of products onto which door hardware will be installed.
4. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.
5. Preinstallation Meeting: Convene a preinstallation meeting one week prior to commencing work of this section; require attendance by all affected installers.
6. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Hardware Schedule
 1. Detailed listing of each item of hardware to be installed on each door. Use door numbering scheme as included in the Contract Documents. Identify electrically operated items and include power requirements.
- C. Product Data
 1. Submit manufacturer's product data and installation instructions.
- D. Manufacturer's Instructions
 1. Indicate special procedures, perimeter conditions requiring special attention.
 2. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- E. Closeout Submittals

1. Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

A. Qualifications

1. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years of experience.
2. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
3. Hardware Supplier Qualifications: Company specializing in supplying commercial door hardware with 5 years of experience.
4. Hardware Supplier Personnel: Employ an Architectural Hardware Consultant (AHC) to assist in the work of this section.
5. Prior to final project acceptance, supplier's representative shall make one field inspection and certify, in writing to the Architect, that hardware installation complies with the project documents, approved hardware schedule, and Manufacturer's instructions, and that installation is complete and all hardware items have been properly installed and correctly adjusted, or provide a list of items that require correction.

B. Regulatory Requirements

1. Comply with the applicable requirements of Oregon Structural Specialty Code, latest edition.

C. Pre-Installation Meetings

1. Keying Conference:
 - a. Upon receipt of approved hardware schedule, supplier will, at the earliest convenience, lead a meeting with the Owner at the project site. The purpose of the meeting will be to review keying requirements.
 - b. Following this meeting, the Supplier will provide Written Schedule showing keying of all new Lock Systems.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Acceptance at Site

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

B. Storage

1. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes.

1.8 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

1.9 PROJECT CLOSEOUT

A. Keys

1. Deliver with identifying tags to Owner by security shipment direct from hardware supplier.
- B. Maintenance Materials and Tools
 1. Furnish the following for Owner's use in maintenance of project.
- C. Tools
 1. One set of all special wrenches or tools applicable to each different or special hardware component, whether supplied by the hardware component manufacturer or not.
- D. Owner Training
 1. Prior to final project acceptance, supplier's representative shall instruct Owner how to properly adjust and maintain hardware.

1.10 PROJECT RECORD DOCUMENTS

- A. Record actual locations of concealed equipment, services, and conduit.

PART 2 PRODUCTS

2.1 PRODUCT GENERAL REQUIREMENTS

- A. Provide hardware specified or required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.
- B. Provide items of a single type of the same model by the same manufacturer.
- C. Hardware for Smoke and Draft Control Doors (Indicated as "S" on Drawings): Provide hardware that enables door assembly to comply with air leakage requirements of the applicable code.
- D. Product and Manufacturer – Basis of Design
 1. See 08 0607 – Door Hardware Schedule.
 2. Other Acceptable Products and Manufacturers
 - a. Allegion Brands, Ives, LCN, Schlage, Steelcraft, or Von Duprin.
 - b. Assa Abloy Brands, Corbin Russwin, Curries, McKinney, Norton, Sargent, or Yale.
 - c. C. Best Access Systems, division of Stanley Security Solutions.
 - d. D. C. R. Laurence Company, Inc.
 - e. DORMA USA, Inc.
 - f. Hager Companies.
 - g. Trimco Hardware.
 - h. Substitutions: See Section 01 6000 – Product Requirements.
- E. Function
 1. Lock and latch function numbers and descriptions of manufactures series as listed in hardware schedule.
- F. Electrically Operated and/or Controlled Hardware

1. Provide all power supplies, power transfer hinges, relays, and interfaces required for proper operation; provide wiring between hardware and control components and to building power connection.

G. Finishes

1. Identified in schedule.

2.2 KEYING

A. Provide locks and interchangeable cylinder cores for construction purposes as required by General Contractor.

B. Door Locks: Master Keyed.

1. Provide 6 master keys all stamped "DO NOT DUPLICATE".
2. Provide 4 change keys for each lock, all stamped "DO NOT DUPLICATE".

2.3 COMPONENT DESCRIPTIONS

2.4 Locks

A. Provide a lock for every door, unless specifically indicated as not requiring locking.

B. Hardware Sets indicate locking functions required for each door.

C. Lock Cylinders

1. Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.

D. Electrically Operated Locks

1. Fail secure unless otherwise indicated.

2.5 Lock Cylinders

A. Manufacturer's standard tumbler type, six-pin standard core.

B. Provide cams and/or tailpieces as required for locking devices required.

2.6 Strikes

A. Extended curved lip where required to protect trim from being marred by extended latch bolt.

2.7 Latches

A. Provide a latch for every door that is not required to lock, unless specifically indicated "push/pull" or "not required to latch".

2.8 Cylindrical Locksets

A. Complying with the appropriate section of BHMA A156.

2.9 Mortise Locksets

A. Complying with the appropriate section of BHMA A156.

2.10 Hinges

A. Provide hinges on every swinging door unless otherwise indicated.

B. Provide five-knuckle full mortise ball-bearing butt hinges unless otherwise indicated.

- C. Provide hinges in the quantities indicated.
- D. Provide non-removable pins on all outswinging exterior and interior doors.
- E. Where electrified hardware is mounted in door leaf, provide power transfer hinges unless otherwise indicated.

2.11 Push/Pulls

- A. Comply with BHMA A156.6.
- B. Provide push and pull on doors not specified to have lockset, latchset, exit device, or auxiliary lock.
- C. On solid doors, provide matching push plate and pull plate on opposite faces.
- D. On glazed storefront doors, provide matching push/pull bars on both faces.

2.12 Closers

- A. Complying with BHMA A156.4.
- B. Check degree of opening for all closers. Mount closer away from exterior, corridors and public spaces. Unless specifically specified, do not restrict door swing.
- C. Provide surface-mounted, door-mounted closers unless otherwise indicated.
- D. Provide a door closer on every exterior door.
- E. On pairs of swinging doors, if an overlapping astragal is present, provide coordinator to ensure the leaves close in proper order.
- F. At corridors, locate door-mounted closer on room side of door.
- G. At out-swinging exterior doors, mount closer in inside of door.

2.13 Automatic Door Operator

- A. Actuators
 - 1. Provide wired or wireless type as shown on Hardware Schedule. Verify location of actuators with Architect during rough-in stage of the work. Coordinate installation and operation with access control system and other door hardware.
- B. Receivers
 - 1. Provide number of receivers necessary for complete operation and integration of electric locking systems, typically 2 or more.
- C. Control sequence for operators on doors with electric strikes and access control systems:
 - 1. Interior actuator (ADA button)
 - a. Automatic door operator will swing open the door regardless of whether or not the electric strike is engaged (locked mode) when button is pressed. This will require the interior actuator receiver to act independently of the exterior actuator receiver to release the electric strike just prior to the operator engaging and opening the door.
 - 2. Exterior actuator (ADA button)

- a. Automatic door operator will only engage and open the door after an approved access badge is presented to the card reader and the electric strike is disengaged (unlocked mode).
- D. Coordinate interface and operation with automatic door operator wiring installer. Control sequence for operators on doors with electric strikes:
 - 1. Interior actuator (ada button)
 - a. Automatic door operator will swing open the door regardless of whether or not the electric strike is engaged (locked mode) when button is pressed. This will require the interior actuator receiver to act independently of the exterior actuator receiver to release the electric strike just prior to the operator engaging and opening the door.
 - 2. Exterior actuator (ada button)
 - a. Automatic door operator will only engage and open the door if the mortise lock deadbolts is not thrown and the door is in the unlocked mode.

2.14 Stops and Holders

- 1. Complying with BHMA A156.8; provide a stop for every swinging door, unless otherwise indicated.
- 2. Provide wall stops, unless otherwise indicated.
- 3. If wall stops are not practical, due to configuration of room or furnishings, provide overhead stop.
- 4. Stop is not required if positive stop feature is specified for door closer; positive stop feature of door closer is not an acceptable substitute for a stop unless specifically so stated.

2.15 Gaskets and Thresholds

- A. Complying with BHMA A156.21.
- B. At each exterior door, provide a threshold unless otherwise indicated.
- C. Field cut threshold to frame for tight fit.
- D. Fasteners At Exterior Locations: Non-corroding.

2.16 Kick Plates

- 1. Provide on push side of every door with closer, except aluminum storefront and glass entry doors, and as scheduled.

2.17 Drips

- A. Provide projecting drip guard over all exterior doors unless they are under a projecting roof or canopy, and as scheduled.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions

1. Verify that doors and frames are ready to receive work; labeled, fire-rated doors and frames are present and properly installed, and dimensions are as indicated on shop drawings.

3.2 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.
- B. Use templates provided by hardware item manufacturer.
- C. Install hardware on fire-rated doors and frames in accordance with code and NFPA 80.
- D. Mounting heights for hardware from finished floor to center line of hardware item:
 1. For steel doors and frames: Comply with DHI "Recommended Locations for Architectural Hardware for Steel Doors and Frames."
 2. For wood doors: Comply with DHI "Recommended Locations for Architectural Hardware for Wood Flush Doors."
 3. At doors with attached pulls separate from the exit devices, and door cylinder locks, verify location of cylinder with Architect to maintain access clearance. Cylinder is not to be located in line with and behind door pulls.

3.3 FIELD QUALITY CONTROL

- A. Adjusting
 1. Adjust hardware for smooth operation.
 2. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.
 3. Test and adjust all Locks and Latches, including Lock Keyways for smooth and easy operation.
- B. Site Tests, Inspections
 1. Provide an Architectural Hardware Consultant to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

3.4 CLEANING

- A. Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.5 PROTECTION

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

END OF SECTION

**SECTION 08 8000
GLAZING**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Glass.
- B. Glazing compounds and accessories.

1.2 RELATED REQUIREMENTS

- A. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures.
- B. Section 01 3000 – Administrative Requirements: Submittal review procedures.
- C. Section 01 6000 – Product Requirements: Substitution request procedures.
- D. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.
- E. Section 08 1113 - Metal Doors and Frames: Glazed doors and borrowed lites.
- F. Section 08 1416 - Flush Wood Doors: Glazed lites in doors.
- G. Section 10 2800 – Toilet Accessories: Framed mirrors.

1.3 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; U.S. Consumer Products Safety Commission; current edition.
- B. ASTM C1036 - Standard Specification for Flat Glass; 2011e1.
- C. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.
- D. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.
- E. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2012a.
- F. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.
- G. GANA (GM) - GANA Glazing Manual; Glass Association of North America; 2009.
- H. GANA (SM) - GANA Sealant Manual; Glass Association of North America; 2008.
- I. OSSC - Oregon Structural Specialty Code, latest edition.

1.4 SYSTEM DESCRIPTION

- A. Performance Requirements
 - 1. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
 - a. Design Pressure: Calculated in accordance with ASCE 7.
 - b. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.

- c. Seismic Loads: Design and size glazing components to withstand seismic loads and sway displacement in accordance with the requirements of ASCE 7.
 - d. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
 - e. Glass thicknesses listed are minimum.
2. Vapor Retarder and Air Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier.
- a. In conjunction with vapor retarder and joint sealer materials described in other sections.
 - b. To utilize the inner pane of multiple pane insulating glass units for the continuity of the vapor retarder and air barrier seal.
 - c. To maintain a continuous vapor retarder and air barrier throughout the glazed assembly from glass pane to heel bead of glazing sealant.
3. Thermal and Optical Performance: Provide glass products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
- a. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
 - b. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
 - c. Solar Optical Properties: Comply with NFRC 300 test method.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data
 - 1. Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
- C. Samples
 - 1. Purpose: Appearance of glazing
 - 2. Quantity: (2)
 - 3. Size: 12 in. by 12 in.

1.6 QUALITY ASSURANCE

- A. Quality Standards
 - 1. Perform Work in accordance with GANA Glazing Manual and GANA Sealant Manual for glazing installation methods.
 - 2. Safety glazing to comply with OSSC requirements.
- B. Qualifications
 - 1. Installer Qualifications: Company specializing in performing the work of this section with minimum three years of experience.

2. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

C. Regulatory Requirements

1. Comply with the applicable requirements of Oregon Structural Specialty Code, latest edition.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Acceptance at Site

1. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.

B. Storage

1. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes.

1.8 PROJECT/SITE CONDITIONS

- A. Do not install glazing when ambient temperature is less than 50 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.9 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide a ten (10) year warranty to include coverage for seal failure, inter-pane dusting or misting, including replacement of failed units.

PART 2 PRODUCTS

2.1 PRODUCT GENERAL REQUIREMENTS

A. Manufacturers

1. AGC Flat Glass North America, Inc.
2. Cardinal Glass Industries.
3. Guardian Industries Corp.
4. Pilkington North America Inc.
5. Viracon.
6. Vitro Glazings
7. Substitutions: See Section 01 6000 – Product Requirements.

2.2 GLASS COMPONENTS

A. Float Glass

1. Annealed Type
 - a. ASTM C1036, Type I, transparent flat, Class 1 clear, Quality Q3(glazing select).

2. Heat-Strengthened and Fully Tempered Types
 - a. ASTM C1048, Kind HS and FT.
 - b. Safety glazing shall comply with CPSC 16 CFR1201.
 - c. Heat strengthen glazing exposed to high temperatures caused by the reflection and/or absorption of solar heat, and/or when recommended by the glazing manufacturer, and/or when required by other items of this specification section.
 - d. Heat temper glazing when required by other items of this specification section, and/or the drawings, and/or the building code.
 - e. Heat treating process should minimize Roller Wave Distortion.
 - f. Orient the glass in the heat treating oven so that the roller waves are parallel to the ground plane of the building.
3. Thicknesses
 - a. 1/4 in. thick unless noted otherwise.
 - b. For exterior glazing comply with specified requirements for wind load design regardless of specified thickness.
4. Applications
 - a. Provide float glass glazing unless otherwise indicated.
5. Applications – Fully Tempered
 - a. Glazed lites in doors, except fire doors.
 - b. Glazed sidelights to doors, except in fire-rated walls and partitions.
 - c. Glazed view windows and panels in partitions enclosing athletic activity rooms, except in fire-rated walls and partitions.
 - d. Other locations required by applicable federal, state, and local codes and regulations.
 - e. Other locations indicated on drawings with terms “TEMP”, “TEMPERED” and/or “SAFETY”.
6. Applications – Heat Strengthened
 - a. Exterior pane of glazed unit with applied coating.
- B. Glass Coating
 1. Low E coatings
 2. Products and Manufacturers
 - a. “VExxx” by Viracon
 - b. “Solarban 60” by Vitro Glazing (at clear applications)
 - c. Substitutions: See Section 01 6000 – Product Requirements.
 3. Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
- C. Sealed Insulation Component

1. Durability
 - a. Certified by an independent testing agency to comply with ASTM E2190.
2. Edge Spacers
 - a. Aluminum, bent and soldered corners, 1/2 in.
3. Edge Seal
 - a. Glass to elastomer with supplementary silicone sealant.
4. Purge interpane space with dry hermetic air.

2.3 GLAZING COMPOUND

- A. As recommended by the glazing manufacturer for particular applications.

2.4 ACCESSORIES

- A. As recommended by the glazing manufacturer for particular applications.
- B. Setting Blocks
 1. Neoprene, 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
- C. Glazing Tape, Back Bedding Mastic Type
 1. Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; hardness range of 5 to 30 cured Shore A durometer; coiled on release paper; black color.
- D. Glazing Gaskets
 1. Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; black color.

2.5 GLAZING UNITS – MONOLITHIC

- A. Vision Glass Units
 1. Interior relites and doors
 2. Tint: clear
- B. Transaction Counter Glazing
 1. Safety glazing - Tempered
 2. Clear
 3. Frame: Extruded aluminum "C" Channel.
 4. Total thickness: 1 in.
 5. Application
 - a. Transaction counter

2.6 GLAZING UNITS - INSULATED

- A. Insulated Glass Units

1. Exterior, vision Glass, double glazed
2. Outboard Lite
 - a. Tint: Clear.
 - b. Coating: Apply to #2 surface.
3. Inboard Lite
 - a. Tint: Clear.
 - b. Coating: None.
4. Total thickness: 1 in.
5. Application
 - a. Exterior windows.

2.7 FABRICATION

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
- B. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
 1. Temperature Change
 - a. 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- C. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
- D. Grind smooth and polish exposed glass edges and corners.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions
 1. Verify that openings for glazing are correctly sized and within tolerance.
 2. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.
 3. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant.
- D. Install sealants in accordance with ASTM C1193 and GANA Sealant Manual.

- E. Install sealants in accordance with manufacturer's instructions.
- F. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- G. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- H. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
- I. Set glass lites in proper orientation so that coatings face exterior, or interior as indicated.
- J. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following: weld splatter, fire-safing, plastering, mortar droppings, etc.

3.3 INSTALLATION – GENERAL

- A. Install in strict accordance with manufacturer's instructions and FGMA Glazing Manual.

3.4 INSTALLATION – EXTERIOR/INTERIOR DRY METHOD (GASKET GLAZING)

- A. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- B. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- C. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.5 INSTALLATION – INTERIOR DRY METHOD (TAPE)

- A. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- C. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
- D. Place glazing tape on free perimeter of glazing in same manner described above.
- E. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- F. Knife trim protruding tape.

3.6 CLEANING

- A. Remove glazing materials from finish surfaces.
- B. Remove labels after Work is complete.
- C. Clean glass and adjacent surfaces.

3.7 PROTECTION

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

END OF SECTION

SECTION 09 2116
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Gypsum wall and ceiling board
- B. Gypsum-based backer board
- C. Acoustical insulation
- D. Joint treatment and accessories.
- E. Textured finish system.

1.2 RELATED REQUIREMENTS

- A. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures.
- B. Section 01 3000 – Administrative Requirements: Submittal review procedures.
- C. Section 01 6000 – Product Requirements: Substitution request procedures.
- D. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.
- E. Section 06 1600 – Fiberglass-Mat Gypsum Sheathing: Glas-Mat Sheathing
- F. Section 07 9200 – Acoustical Sealant
- G. Section 09 2216 - Non-Structural Metal Framing.
- H. Section 09 9623 - Painting: Primer/sealer on gypsum board.

1.3 REFERENCE STANDARDS

- A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.
- B. ASTM C514 - Standard Specification for Nails for the Application of Gypsum Board; 2004 (Reapproved 2014).
- C. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.
- D. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2013.
- E. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2015.
- F. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2014.
- G. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base; 2014a.
- H. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2014.

- I. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.
- J. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.
- K. ASTM E413 - Classification for Rating Sound Insulation; 2010.
- L. GA-216 - Application and Finishing of Gypsum Board; 2013.
- M. OSSC - Oregon Structural Specialty Code, latest edition.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data
 - 1. Submit manufacturer's product data and installation instructions.
- C. Shop Drawings
 - 1. Indicate special details associated with acoustic seals.
- D. Samples
 - 1. Purpose: To verify applied texture
 - 2. Quantity: (2)
 - 3. Size: 12 x 12 inches
- E. Quality Assurance Submittals
 - 1. Certificates
 - a. Demonstrate installer meets or exceeds the standards of this section.

1.5 QUALITY ASSURANCE

- A. Quality Standards
 - 1. Gypsum board system standards
 - a. Materials: Comply with Gypsum Association GA-201 "Using Gypsum Board for Walls and Ceilings."
 - b. Application and finishing: Comply with Gypsum Association GA-216 "Recommended Specifications for Application and Finishing of Gypsum Board" and GA 214 "Levels of Gypsum Board Finish."
 - 2. Acoustic Attenuation
 - a. STC of 45-49 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- B. Qualifications
 - 1. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum 3 years of experience.
- C. Regulatory Requirements

1. Comply with the applicable requirements of Oregon Structural Specialty Code, latest edition.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Acceptance at Site

1. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.

B. Storage

1. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes. Neatly stack gypsum boards flat to prevent sagging.
2. Handle gypsum boards to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal corner beads and trim.

C. Waste Management and Disposal

1.7 PROJECT/SITE CONDITIONS

- A. Environmental Conditions, General: Establish and maintain environmental conditions for application and finishing gypsum board to comply with ASTM C 840 and with gypsum board manufacturer's recommendations.
- B. Minimum Room Temperatures: For non-adhesive attachment of gypsum board to framing, maintain not less than 40 degrees F. For adhesive attachment and finishing of gypsum board maintain not less than 50 degrees F for 48 hours before application and continuously thereafter until drying is complete.
- C. Ventilate building spaces to remove water not required for drying joint treatment materials. Avoid drafts during dry, hot weather to prevent materials from drying too rapidly.
- D. Provide adequate lighting during installation and joint finishing treatment.
- E. Protect adjoining surfaces against damage and soiling.

PART 2 PRODUCTS

2.1 GYPSUM BOARD MATERIAL

A. Manufacturers

1. American Gypsum.
2. Celotex.
3. CertainTeed Corporation.
4. Domtar Gypsum America, Inc.
5. Georgia-Pacific Gypsum.
6. National Gypsum Company.
7. PABCO Gypsum.
8. USG Corporation: www.usg.com.
9. Substitutions: See Section 01 1600 – Product Requirements.

- B. General, All Boards
 - 1. This applies to all board types below unless listed otherwise.
 - 2. Dimensions
 - a. Thickness: 5/8 inch
 - b. Sheet Size: Sizes to minimize joints in place.
 - 3. Description
 - a. Edges: Square
 - b. Type X at all applications.
- C. Gypsum Wallboard
 - 1. Application
 - a. Vertical wall and soffit application where “Gyp Board” identified on Drawings.
 - 2. Description
 - a. Paper-faced gypsum panels as defined in ASTM C1396/C1396M.
- D. Water-Resistant Gypsum Wallboard
 - 1. Application
 - a. Vertical wall and soffit surfaces on all walls in wet areas such as restrooms, and within 4 feet of plumbing fixtures in all other rooms.
 - b. Gyp Board ceilings in Restrooms.
 - 2. Description
 - a. Paper-faced moisture-resistant panels (“Greenboard”) as defined in ASTM C1396/C1396M.
 - b. Mold Resistance: Score of 10f when tested in accordance with ASTM D3273.
- E. Gypsum Ceiling Board
 - 1. Application
 - 2. Product
 - a. Substitutions: See Section 01 1600 – Product Requirements
 - 3. Dimensions
 - a. Thickness: 1/2 inch
 - 4. Description
 - a. Paper-faced gypsum panels as defined in ASTM C1396/C1396M.
- F. Water-Resistant Gypsum-based Backer Board
 - 1. Application
 - 2. Product
 - a. Substitutions: See Section 01 1600 – Product Requirements
 - 3. Dimensions

- a. Thickness: 5/8 inch
 - b. Sheet Size: Sizes to minimize joints in place.
4. Description
- a. Edges: Square
 - b. Type X at all applications.

2.2 ACOUSTICAL COMPONENTS

- A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: 3-1/2 inch.
- B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant meeting project's VOC limits; do not use solvent-based non-curing butyl sealant.
- C. Acoustic Sealant: See 07 9200.
- D. Acoustical Framing Accessories: As specified in Section 09 2216 – Non-Structural Metal Framing.
- E. Resilient Furring Channels
 - 1. 1/2-inch- deep members designed to reduce sound transmission.
 - 2. Configuration: Asymmetrical or hat shaped.

2.3 ACCESSORIES

- A. Finishing Accessories
 - 1. ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
 - 2. Types: As detailed or required for finished appearance.
 - 3. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed panel edges.
- B. Reveals and Moldings
 - 1. Expansion and Control Joints: Aluminum, similar to Fry Reglet DRM-50-50 2 piece.
- C. Joint Materials
 - 1. ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
 - 2. Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
 - 3. Water-resistant panels
 - a. USG Durabond Setting-Type Joint Compound for treatment of joints, fasteners, and cut edges of water- resistant panels.
- D. Trim:
 - 1. Galvanized steel with knurled and perforated flanges.
 - 2. Product
 - a. Dur-A-Bead corner bead, No. 200-A, B or C metal trim, No. 093 Control Joint by

USG.

- b. Substitutions: See Section 01 1600 – Product Requirements.
- 3. Ready-mixed vinyl-based joint compound.
- E. Textured Finish Materials
 - a. Latex-based compound; plain.
- F. Fasteners
 - 1. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.
 - 2. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion resistant.
 - 3. Nails for Attachment to Wood Members: ASTM C514.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

- A. Board Installation
 - 1. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
 - 2. Single-Layer Non-Rated
 - a. Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
 - 3. Exposed Gypsum Board in Interior Wet Areas
 - a. Seal joints, cut edges, and holes with water-resistant sealant.
 - 4. Installation on Metal Framing
 - a. Use screws for attachment of gypsum board except face layer of non-rated double-layer assemblies, which may be installed by means of adhesive lamination.
 - 5. Installation on Wood Framing
 - a. For rated assemblies, comply with requirements of listing authority. For non-rated assemblies, install as follows:
 - b. Single-Layer Applications: Screw attachment.
- B. Trim and Accessory Installation
 - 1. Control Joints
 - a. Place control joints consistent with lines of building spaces and as indicated.

- b. Not more than 30 feet apart on walls and ceilings over 50 feet long.
 - 2. Corner Beads
 - a. Install at external corners, using longest practical lengths.
 - 3. Edge Trim
 - a. Install at locations where gypsum board abuts dissimilar materials.
 - 4. Reveal Moulding
 - a. Install in patterns as shown on drawings according to manufacturer's instructions, directly to wall framing, or base layer of wall board in multiple layer applications. Cutting in reveal molding after wall board installation is not acceptable.
 - 5. Wall and Ceiling Mounted Access Hatches
 - a. Coordinate size, location and number of access hatches shown to be provided in other specification sections or on the drawings. Install these access hatches in gypsum board walls and ceilings in accordance with manufacturer's instructions flat and smooth in wall and ceiling surfaces.
- C. Joint Treatment Installation
 - 1. Paper Faced Gypsum Board
 - a. Use paper joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.
 - 2. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
 - 3. Feather coats of joint compound so that camber is maximum 1/32 inch.
- D. Joint Treatment Levels
 - 1. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 - 2. Level 4
 - a. Locations: Typical for all walls and ceilings unless otherwise indicated
 - b. Finish interior gypsum board by applying the following joint compounds in three coats (not including prefill of openings in base), and sand between coats and after last coat:
 - c. Embedding and First Coat: Ready-mix or job mixed setting type joint or taping compound.
 - d. Fill (Second) Coat: Ready-mix or job mixed topping compound.
 - e. Finish (Third) Coat: Ready-mix or job mixed topping compound.
 - 3. Level 3
 - a. Finish concealed gypsum board construction that requires finishing to achieve fire-resistance rating, sound rating or to act as air or smoke barrier the same as exposed gypsum board construction, except the third coat and sanding can be omitted.

- b. Walls above acoustical ceiling systems: Tape and fill joints with two coats of joint compound, sanding not required.
 - 4. Level 2
 - a. In utility areas, behind cabinetry, and on backing board to receive tile finish.
 - 5. Level 1
 - a. Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.
 - E. Texture Finish Installation
 - 1. Coordinate application of paint primer by Section 09 9000 over gypsum board after taping, filling, and sanding, but prior to texture application.
 - 2. Apply finish texture coating by means of spraying apparatus in accordance with manufacturer's instructions and to match approved sample.
 - 3. Texture Required
 - a. Match existing adjacent wall. See Mock-up requirements. Field verify with Architect.
- 3.3 FIELD QUALITY CONTROL
- A. Tolerances
 - 1. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.
- 3.4 PROTECTION
- A. Provide final protection and maintain conditions, in a manner that ensures gypsum board construction will be without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 09 2216
NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal partition, ceiling, and soffit framing.
- B. Framing accessories.
- C. Suspension systems for gypsum board ceilings.

1.2 RELATED REQUIREMENTS

- A. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures.
- B. Section 01 3000 – Administrative Requirements: Submittal review procedures.
- C. Section 01 6000 – Product Requirements: Substitution request procedures.
- D. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.
- E. Section 09 2116 – Gypsum Board Assemblies.

1.3 REFERENCE STANDARDS

- A. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2013.
- B. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2011.
- C. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2007 (Reapproved 2013).
- D. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).
- E. OSSC - Oregon Structural Specialty Code, latest edition.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data
 - 1. Submit manufacturer's product data and installation instructions.
- C. Quality Assurance Submittals
 - 1. Design data/test reports
 - 2. Certificates
 - a. Demonstrate installer meets or exceeds the standards of this section.

1.5 QUALITY ASSURANCE

- A. Qualifications

1. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum 3 years of experience.
 - B. Regulatory Requirements
 1. Comply with the applicable requirements of Oregon Structural Specialty Code, latest edition.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Acceptance at Site
 1. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
 - B. Storage
 1. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes.

PART 2 PRODUCTS

2.1 FRAMING MATERIAL

- A. Product and Manufacturer
 1. Contractor's Choice from products that comply with the requirements of this section.
- B. Dimensions
 1. Minimum Metal Thickness
 - a. Adjacent to door jambs: 20 ga.
 - b. At plywood wall coverings, wall panels: 20 ga.
 - c. At backerboard to receive ceramic tile: 20 ga.
 - d. Wall supporting metal ceiling framing: 20 Contractor to size
 - e. At walls taller than 11'-0" (unsupported height): 20 ga.
 - f. Walls to support casework or plumbing fixtures: 20 ga.
 - g. Walls to support TV brackets: 20 ga.
 - h. Elsewhere: 25 ga.
- C. Description
 1. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf.
- D. Characteristics
 1. Studs: C shaped with flat or formed webs with knurled faces.
 2. Runners: U shaped, sized to match studs.
 3. Ceiling Channels: C shaped.

4. Furring: Hat-shaped sections, minimum depth of 7/8 inch.

2.2 FRAMING ACCESSORIES

- A. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.
- B. Partition Head to Structure Connections
 1. Comply with requirements of ASTM C645.
 2. Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and fastened as indicated on drawings.
 3. One Piece Deflection Track: "VST" by Dale Incor, or approved.
 - a. Upper track with 3 inch minimum flange, web dimension to slip over normal track allowing 2 1/2 inch deflection of structure.
 - b. Slip Connection and Slide Clips: Curtain wall type clip allowing vertical slip connection of studs while providing lateral support.
- C. Tracks and Runners
 1. Same material and thickness as studs, bent leg retainer notched to receive studs .
- D. Flexible Track Top and Bottom Plates for Curved Walls
 1. Flex-C-Trac" by Flex-ability Concepts.
 2. Same wall thickness as studs.
- E. Furring and Bracing Member
 1. Of same material as studs, thickness to suit purpose; complying with applicable requirements of ASTM C754.
- F. Sheet Metal Backing
 1. 0.036 inch thick, galvanized.
- G. Fasteners
 1. ASTM C1002 self-piercing tapping screws.
 2. Anchorage Devices: Powder actuated.
- H. Acoustic Sealant – See Section 07 9200 – Joint Sealant
- I. Touch-Up Primer for Galvanized Surfaces
 1. SSPC-Paint 20, Type I - Inorganic.
- J. Foam Gasket:
 1. 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.
- K. Furring Channels (Furring Members):
 1. Cold-Rolled Channels
 - a. 0.053-inch uncoated-steel thickness, with minimum 1/2-inch- wide flanges, 3/4 inch deep.

2. Hat-Shaped, Rigid Furring Channels
 - a. ASTM C 645, 7/8 inch deep.
 - b. Minimum Base-Metal Thickness: 20 ga unless noted otherwise.
3. Resilient Furring Channels
 - a. 1/2-inch- deep members designed to reduce sound transmission.
 - b. Configuration: Asymmetrical or hat shaped.

PART 3 EXECUTION

3.1 EXAMINATION

A. Site Verification of Conditions

1. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
2. Verify that rough-in utilities are in proper location.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

B. Coordination with Sprayed Fire-Resistive Materials:

1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.
2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION

A. Installation – General

1. Installation Standard: ASTM C 754.
 - a. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
2. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
3. Install bracing at terminations in assemblies.

4. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.
- B. Installation – Stud Framing
1. Comply with requirements of ASTM C754.
 2. Extend partition framing to structure or ceiling as indicated on drawings.
 3. Partitions Terminating at Ceiling
 - a. Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
 4. Partitions Terminating at Structure
 - a. Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions.
 - b. Verify free movement of top of stud connections.
 - c. Do not leave studs unattached to track.
 5. Door Openings
 - a. Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 - b. Install two studs at each jamb unless otherwise indicated.
 - c. 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.
 - d. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
 6. Other Framed Openings
 - a. 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.
 7. Firestop Track
 - a. Where indicated, install to maintain continuity of fire-resistance- rated assembly indicated.
 8. Sound-Rated Partitions
 - a. Install framing to comply with sound-rated assembly indicated.
 9. Curved Partitions:
 - a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
 - b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches o.c.

10. Align and secure top and bottom runners at 16 inches on center.
 11. At partitions indicated with an acoustic rating or where shown on drawings to receive acoustic insulation:
 - a. Place one bead of acoustic sealant between runners and substrate, studs and adjacent construction.
 - b. Place two beads of acoustic sealant between studs and adjacent vertical surfaces.
 12. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.
 13. Install studs vertically at spacing indicated on drawings. If spacing not listed, comply with the following:
 - a. Walls framing to support tile systems: 16" o.c.
 - b. Soffits and Ceilings supporting gypsum board: 16" o.c.
 - c. Walls and soffits supporting wood blocking or wood sheathing: 16" o.c.
 - d. Elsewhere: 24" o.c.
 14. Align stud web openings horizontally.
 15. Secure studs to tracks using fastener method. Do not weld.
 16. Stud splicing is not permissible.
 17. Fabricate corners using a minimum of three studs.
 18. Double stud at wall openings, door and window jambs, not more than 2 inches from each side of openings.
 19. Brace stud framing system rigid.
 20. Coordinate erection of studs with requirements of door frames; install supports and attachments.
- C. Coordinate installation of bucks, anchors, and blocking with electrical, mechanical, and other work to be placed within or behind stud framing.
- D. Blocking
1. Use steel channels secured to studs. Provide blocking for support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, hardware, opening frames, and other accessories shown on drawings.
- 3.4 FIELD QUALITY CONTROL
- A. Tolerances
1. Maximum Variation from True Position: 1/8 inch in 10 feet.
 2. Maximum Variation from Plumb: 1/8 inch in 10 feet.

END OF SECTION

09 5100

ACOUSTICAL CEILINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustical units for lay-in application.

1.2 RELATED REQUIREMENTS

- A. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures.
- B. Section 01 3000 – Administrative Requirements: Submittal review procedures.
- C. Section 01 6000 – Product Requirements: Substitution request procedures.
- D. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.
- E. Section 06 6100 – Rough Carpentry: Wall Framing.
- F. Section 09 2116 – Gypsum Board Assemblies. Wall Finish.
- G. Section 09 2216 – Non-Structural Metal Framing. Wall Framing.

1.3 REFERENCE STANDARDS

- A. ASCE 7-05 - Minimum Design Loads for Buildings and Other Structures; American Society of Civil Engineers; current edition.
- B. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; current edition.
- C. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels; current edition.
- D. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; current edition.
- E. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; current edition.
- F. NWCB TB 401 - Suspension Systems for Acoustical Lay-in Ceilings, Field Technical Information; Northwest Wall and Ceiling Bureau; current edition.
- G. OSSC - Oregon Structural Specialty Code, latest edition.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data
 - 1. Product data: Suspension system components, acoustical units, and seismic restraint components including perimeter clips.
 - 2. Installation instructions: Indicate special procedures, perimeter conditions requiring special attention, and seismic restraint details.

- C. Samples
 - 1. Purpose: To verify supplied product matches existing conditions [or design intent].
 - 2. Quantity: Two.
 - 3. Size: 6 in x 6 in.
- 1.5 QUALITY ASSURANCE
 - A. Qualifications
 - 1. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum 3 years of experience.
 - 2. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
 - 3. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
 - B. Regulatory Requirements
 - 1. Comply with the applicable requirements of Oregon Structural Specialty Code, latest edition.
- 1.6 DELIVERY, STORAGE, AND HANDLING
 - A. Acceptance at Site
 - 1. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
 - B. Storage
 - 1. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes.
- 1.7 PROJECT/SITE CONDITIONS
 - A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.
- 1.8 SEQUENCING
 - A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
 - B. Do not install acoustical units until after interior wet work is dry.
- 1.9 WARRANTY
 - A. Provide manufacturer's standard warranty.
 - B. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- 1.10 EXTRA STOCK
 - A. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

- B. Store where directed in un-opened cartons.

PART 2 PRODUCTS

2.1 PRODUCT GENERAL REQUIREMENTS

- A. The acoustical ceiling tile units and suspension system to be from the same manufacturer.
- B. Manufacturer – Basis of Design
 - 1. Armstrong World Industries.
- C. Other Acceptable Products and Manufacturers
 - 1. CertainTeed Corporation.
 - 2. USG.
 - 3. Substitutions: See Section 01 6000 – Product Requirements.

2.2 ACOUSTICAL UNITS

- A. Product: ACT 1 - “Second Look II” by Armstrong.
 - 1. Dimensions
 - a. Unit size: 24 in. x 24 in.
 - b. Thickness: 5/8 in.
 - 2. Description
 - a. ASTM E 1264 Type III.
 - 3. Materials
 - a. Painted mineral fiber.
 - 4. Characteristics
 - a. Edges: Square.
 - b. Color: White
 - c. Extent: Where “ACT” or “Acoustical Ceiling Tile” noted on the drawings.

2.3 SUSPENSION SYSTEM

- A. Product: “Prelude 15/16 in” by Armstrong.
- B. Dimensions
 - 1. Tee: 15/16” wide face.
- C. Description
 - 1. ASTM C635/C635M
 - 2. Die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.
- D. Materials
 - 1. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled heavy duty main beams and intermediate duty cross runners.

E. Characteristics

1. Double web construction.
2. Color: White.

F. Accessories

1. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
2. Wire gauge: Minimum 12 gauge.
3. Powder-driven Anchors: When used for seismic restraint purposes, anchors to be ICC-ES approved for seismic applications.
4. Perimeter Moldings: Same material and finish as grid. At exposed grid, provide L-shaped molding for mounting at same elevation as face of grid.
5. Perimeter Clips: Manufacturer's standard; approved for use in lieu of 2 inch wide perimeter molding.
6. Seismic ceiling joint trim or device: Manufacturer's standard providing 3/4 inch movement, matching grid. Example includes Armstrong "Seismic Joint Clip Main Beam".
 - a. Extent: Provide seismic joints at ceilings of a continuous plane at intervals of 2,500 sf max. Identify locations on shop drawings for review by Architect.

G. Extent

1. Support for Acoustical Ceiling Tile system.

2.4 ACCESSORIES

- A. Acoustical Sealant For Perimeter Moldings: Non-hardening, non-skinning, for use in conjunction with suspended ceiling system.
- B. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 EXISTING CEILINGS

- A. Where required, or shown on plans, remove existing ceiling tile being careful not to damage existing suspension system to provide access to above ceiling space for new work.
- B. Remove existing over-ceiling insulation, if any, and store for reuse.
- C. Remove and store for replacement, any existing suspension system, where access to above Ceiling Plane areas is required by other trades.
- D. Unless required for access above the ceiling plane, or if existing ceiling height is to be changed, the existing suspension systems shall be left in place, extended for new ceiling work, and cleaned and refurbished to like new condition.
- E. If more than 50% of the ceiling tile within a room is removed, altered, repaired, or replaced:

1. Provide additional supports and bracing to bring existing ceiling system up to current building code requirements.
 2. Lateral Force Bracing (splay wires)
 - a. Maximum vertical hanger splay: 6 inches per 4 ft.
 3. Compression Struts
 - a. Provide at 8'-0" on center
 4. Slack wires on all light fixtures and air terminals
 5. Connect primary and secondary runners to wall trim with clip and screws, or rivet.
- F. Replace any broken or damaged tiles with new matching units not from Owner's own stock.

3.3 INSTALLATION

A. Installation – Suspension System

1. Install suspension system in accordance with ASCE 7-05, ASTM C 636/C 636M, ASTM E 580/E 580M, and manufacturer's instructions and as supplemented in this section.
2. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
3. Provide seismic bracing as required by OSSC for Occupancy Category II, Seismic Design Category D. NWCB Technical Bulletin 401 may be used as a reference.
 - a. Secure grid system to two adjacent walls, provide 3/4 inch movement at opposite walls.
 - b. Utilize approved perimeter clips instead of 2 inch wide perimeter moldings.
 - c. Install seismic ceiling expansion joints to divide ceiling system areas to less than 2,500 square feet. Review locations with Architect, adjust locations as directed.
 - d. Install powder-driven anchors for seismic applications in accordance with ICC-ES approval and with special inspection.
4. Locate system on room axis according to reflected plan.
5. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
6. Hang suspension system independent of walls, columns, ducts, pipes and conduit.
7. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
8. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
9. Do not allow hangers or bracing to obstruct parts of mechanical or electrical systems requiring maintenance.
10. Provide framing around any recessed lighting fixtures and other openings.
11. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

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

B. Installation – Acoustical Units

1. Install acoustical units in accordance with manufacturer's instructions.
2. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
3. Lay directional patterned units with pattern parallel to longest room axis.
4. Fit border trim neatly against abutting surfaces.
5. Install units after above-ceiling work is complete.
6. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
7. Cutting Acoustical Units:
 - a. Cut to fit irregular grid and perimeter edge trim.
 - b. Make field cut edges of same profile as factory edges.
 - c. Double cut and field paint exposed reveal edges.
8. Install hold-down clips on each panel to retain panels tight to grid system; comply with fire rating requirements.

3.4 FIELD QUALITY CONTROL

A. Tolerances

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

B. Site Tests, Inspections

1. An independent testing agency will perform Special Inspection for powder-driven shot-in anchors used as part of the seismic design, as specified in Section 01 1400.

3.5 CLEANING

- A. Replace any damaged, chipped, scratched, or broken ceiling tile units identified up to the time of final completion. Use of sealant or putty patch material to conceal damage is not allowed.

END OF SECTION

SECTION 09 6500
RESILIENT FLOORING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Resilient Tile Flooring
- B. Resilient Base
- C. Installation Accessories

1.2 RELATED REQUIREMENTS

- A. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures.
- B. Section 01 3000 – Administrative Requirements: Submittal review procedures.
- C. Section 01 6000 – Product Requirements: Substitution request procedures.
- D. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.
- E. Section 09 2100 – Gyp Board Assembly

1.3 REFERENCE STANDARDS

- A. ASTM D2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine.
- B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
- C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
- D. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile.
- E. ASTM F1861 - Standard Specification for Resilient Wall Base.
- F. ASTM F1913 - Standard Specification for Vinyl Sheet Floor Covering Without Backing.
- G. OSSC - Oregon Structural Specialty Code, latest edition.

1.4 SYSTEM DESCRIPTION

A. Design Requirements

1. General

- a. Install flooring according to pattern indicated in the Drawings. If pattern not shown on the Drawings, verify with Architect prior to installation.
- b. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door. Lay flooring continuous through doors and openings where adjacent rooms and areas have same finish and color.
- c. Center field or patterns within space or area such that no border unit is less than ½ width of unit.

2. Tile Flooring Layout

- a. Layout units with patterns in alternating direction.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data
 - 1. Submit manufacturer's product data and installation instructions.
 - 2. Include sizes, patterns, and available colors.
- C. Shop Drawings
 - 1. Provide seaming plan.
- D. Samples
 - 1. Provide samples per size and quantity below as selected [\[available for selection\]](#) for each type.
 - 2. Quantity per type: (2)
 - 3. Tile Flooring: 4 in. by 4 in.
 - 4. Bases: standard sample size.
- E. Quality Assurance Submittals
 - 1. Manufacturer's Instructions
 - a. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.6 QUALITY ASSURANCE

- A. Qualifications
 - 1. Installer: Demonstrated experience installing the product for a minimum of 3 years.
- B. Regulatory Requirements
 - 1. Comply with the applicable requirements of Oregon Structural Specialty Code, latest edition.
- C. Mock-ups
 - 1. Not required

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Acceptance at Site
 - 1. Deliver packaged materials to the project site in manufacturer's original, unopened containers with seals unbroken and labels indicating brand names, color, and patterns, and quality designations legible and intact.
 - 2. Do not open containers or remove labels until materials have been inspected and accepted.
- B. Storage
 - 1. Store and protect accepted materials in accordance with manufacturer's directions and recommendations.

2. Store resilient materials areas to receive resilient materials for not less than 48 hours prior to installation to achieve temperature stability.

1.8 PROJECT/SITE CONDITIONS

A. Environmental Conditions:

1. Maintain temperature in storage area between 55 and 90 degrees Fahrenheit.
2. Preheat the areas to receive resilient materials to 68 degrees Fahrenheit minimum for at least 72 hours prior to installation.
3. Once that installation has begun, the above criteria are to be observed 24 hours a day seven days a week until completion of the installation, and for a minimum of 72 hours following the installation. Thereafter maintain minimum temperature of 55 degrees Fahrenheit.

B. Close spaces to traffic during installation of products specified in this Section.

C. Provide for continuous ventilation during installation using as close to 100 percent outside air as possible.

1.9 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

1.10 EXTRA STOCK

A. Flooring Material: 20 square feet of each type and color.

B. Base: 10 linear feet of each type and color.

PART 2 PRODUCTS

2.1 RESILIENT TILE FLOORING

A. Vinyl Composition Tile

1. Product and Manufacturer – Basis of Design
 - a. “Standard Excelon Imperial Textured” by Armstrong World Industries, Inc
2. Other Acceptable Products and Manufacturers
 - a. Johnsonite, Inc; a Tarkett Company.
 - b. Mannington Mills, Inc.
 - c. Substitutions: See Section 01 6000 – Product Requirements

B. Dimensions

1. Size: 12 by 12 inches.
2. Thickness: 1/8 inch.

C. Description

1. Meet requirements of ASTM F1066 Composition 1, Class 2.

D. Finishes

1. As indicted on Drawings and/or as scheduled.

2. Architect to select from manufacturer's available product line.

E. Extent

1. Where "VCT1" is scheduled.

2.2 RESILIENT BASE

A. Rubber Base

1. Product and Manufacturer – Basis of Design
 - a. "Traditional Wall Base" by Johnsonite Inc.
 2. Other acceptable products and manufacturers
 - a. Burke Flooring: www.burkemercer.com.
 - b. Roppe Corp: www.roppe.com.
 - c. Marley Flexco www.marleyflexco.com.
 - d. Substitutions: See Section 01 6000 – Product Requirements

B. Dimensions

1. Height: Nominal; 4 inch.
2. Thickness: 0.125 inch.
3. Length: Roll.

C. Description

1. ASTM F1861, Type TP, Group 1.
2. Smooth thermoplastic rubber, top set cove type at resilient flooring and straight (toeless) at carpet.
3. Finish: Satin.

D. Accessories

1. Preformed end stops.

E. Finishes

1. Architect to select from manufacturer's available product line.

F. Extent

1. Where "RB" is scheduled.

2.3 ACCESSORIES

A. Edge (Reducer) Strips

1. Product
 - a. "Tile Reducer No. 633" by Burke Flooring.
 - b. "Johnsonite Reducer Strip RRS-XX Series" by Johnsonite Inc.
 - c. Substitutions: See Section 01 6000 – Product Requirements.
2. Description: Vinyl; color as selected from manufacturer's standard range.

3. Color and Pattern: As indicated on Drawings.
- B. Adaptors; Carpet to Resilient
1. Product
 - a. "Johnsonite Adaptor No. CTA-XX-A Series" by Johnsonite Inc.
 - b. Substitutions: See Section 01 6000 – Product Requirements.
 2. Description: Vinyl adapter for transition between carpet and resilient flooring.
 3. Color and Pattern: As indicated on Drawings.
- C. Adaptors; Ceramic Tile to Resilient
1. Product:
 - a. "Johnsonite Adaptor No. CTA-XX-H Series" by Johnsonite Inc.
 - b. Substitutions: See Section 01 6000 – Product Requirements.
 2. Description: Vinyl adapter for transition between ceramic tile and resilient flooring.
 3. Color and Pattern: As indicated on Drawings.
- D. Edge Moldings and Transition Strips
1. Manufacturer
 - a. Burke Flooring.
 - b. Johnsonite Inc.
 - c. Substitutions: See Section 01 6000 – Product Requirements.
 2. Description: Vinyl; profiles as indicated on Drawings or as required for adjoining floor surfaces.
 3. Color: As selected from manufacturer's standard range to match or be compatible with darker flooring color.
 4. Extent: Between Resilient Flooring and Other Flooring Materials that are Not Carpet

2.4 RELATED MATERIALS

- A. Sealer
1. Type recommended by flooring manufacturer.
- B. Leveling and Underlayment Compound:
1. Latex cementitious type as recommended by adhesive manufacturer, having minimum density of 4,000 psi after 28 days.
- C. Adhesives: Adhesive must meet the following requirements:
1. Recommended by the flooring manufacturer for application.
 2. Meet or exceed the vapor barrier blockage requirement by the applicable flooring manufacturer for installation.
 3. Solvent-free, water-resistant, mildew-resistant, non-flammable, low odor adhesive to suit resilient sheet flooring, resilient tie flooring, resilient base][base, resilient stair covering,]and accessories and substrate conditions indicated.

4. Have VOC content of less than 100 g/L.

PART 3 EXECUTION

3.1 EXAMINATION

A. Site Verification of Conditions

1. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
2. Verify that required floor-mounted utilities are in correct location.

B. Concrete Floors:

1. Cure concrete surfaces a minimum of 28 days prior to beginning carpet work.
2. Comply with requirements of ASTM F 710 - Practice for Preparing Concrete Floors and Other Monolithic Floors to Receive Resilient Flooring.
3. Perform the following tests. If test results exceed carpet [and cushion] manufacturer's limitations, do not commence installation until corrective actions have been completed.
 - a. Moisture Testing: Perform calcium chloride tests in accordance with ASTM F 1869.
 - b. Perform bond tests in accordance with carpet manufacturer's recommendations.
 - c. Perform pH tests in accordance with carpet manufacturer's recommendations.
4. Provide topical vapor barrier that is acceptable to the flooring and adhesive manufacturers if the test results are not within the flooring manufacturer's limits and retest until results are satisfactory.
5. Where concrete floors show varying porosity or are excessively dusty or powdery, treat with sealer applied as per sealant manufacturer's directions.

3.2 PREPARATION

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- C. Prohibit traffic until filler is cured.
- D. Application over Existing Floor Material
 1. Use a liquid stripper in removing old polish, dirt, dust, oils, grease, and any deleterious materials that will effect proper installation.
 2. Repair minor floor irregularities with underlayment material.

3.3 INSTALLATION

A. Installation - General

1. See System Description, Design Requirements above for more.
2. Starting installation constitutes acceptance of sub-floor conditions.
3. Install in accordance with manufacturer's instructions.
4. Spread only enough adhesive to permit installation of materials before initial set.
5. Fit joints tightly.

6. Set flooring in place, press with heavy roller to attain full adhesion.
7. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
8. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

B. Installation - Tile Flooring

1. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
2. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern.

C. Installation - Base

1. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
2. Miter internal corners. At external corners, 'V' cut back of base strip to 2/3 of its thickness and fold. At exposed ends, use pre-molded units.
3. Install base on solid backing. Bond tightly to wall and floor surfaces.
4. Scribe and fit to door frames and other interruptions.

3.4 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean and seal in accordance with manufacturer's instructions.

3.5 PROTECTION

- A. Prohibit traffic on resilient flooring for 48 hours after installation.
- B. Protect flooring from damage after installation. Protection system to allow flooring to breath and not trap moisture.

END OF SECTION

SECTION 09 9000
PAINTING AND COATING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Interior painting systems
- B. Exterior painting systems
- C. Surface prep

1.2 RELATED REQUIREMENTS

- A. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures.
- B. Section 01 3000 – Administrative Requirements: Submittal review procedures.
- C. Section 01 6000 – Product Requirements: Substitution request procedures.
- D. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.
- E. Section 09 2116 – Gypsum Board Assemblies: Integration of PVA primer in texturing process.

1.3 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.
- C. MPI Architectural Painting Specifications Manual.
- D. OSSC - Oregon Structural Specialty Code, latest edition.

1.4 SYSTEM DESCRIPTION

- A. Performance Requirements
 - 1. Gloss levels according to ASTM D 523
 - 2. Gloss Level 1
 - a. Not more than 5 units at 60 degrees and 10 units at 85 degrees.
 - b. Flat
 - 3. Gloss Level 2
 - a. Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees.
 - b. Flat, “Velvet-like”
 - 4. Gloss Level 3
 - a. 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees.
 - b. Eggshell
 - 5. Gloss Level 4
 - a. 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees.

- b. Satin
- 6. Gloss Level 5
 - a. 35 to 70 units at 60 degrees.
 - b. Semigloss.
- 7. Gloss Level 6
 - a. 70 to 85 units at 60 degrees.
 - b. Gloss
- 8. Gloss Level 7
 - a. More than 85 units at 60 degrees.
 - b. High Gloss

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data
 - 1. Submit manufacturer's product data and installation instructions.
 - 2. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 - 3. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.
 - 4. VOC content.
 - 5. Include above information in project closeout Operations and Maintenance manuals.
- C. Samples – Paint Drawdown
 - 1. Purpose: For selection of color
 - 2. Quantity: (2) sets; one set for evaluation and section, one set based on final selection.
 - a. Provide drawdown per color, paint type, and gloss.
 - 3. Size: 6 by 6 inches.
- D. Quality Assurance Submittals
 - 1. Certificates
 - a. Demonstrate installer meets or exceeds the standards of this section.
- E. Closeout Submittals
 - 1. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

1.6 QUALITY ASSURANCE

- A. Quality Standards
 - 1. MPI Standards: Comply with requirements in "MPI Architectural Painting Specifications Manual" for products and pain systems indicated.

B. Qualifications

1. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum 3 years of experience.

C. Mock-ups

1. Purpose: Provide panel to illustrate paint coating cut-in, color, texture, and finish.
2. Size: 10 ft by 10 ft
3. Locate where directed.
4. Mock-up may remain as part of the work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Acceptance at Site

1. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.

B. Storage

1. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
2. Maintain containers in clean condition, free of foreign materials and residue.
3. Remove rags and waste from storage areas daily.

1.8 PROJECT/SITE CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1.9 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

1.10 EXTRA STOCK

- A. Paint: (1) gallon of each paint type and color.
 1. Label each container with color in addition to the manufacturer's label.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Provide all paint and coating products used in any individual system from the same manufacturer, no exceptions.
- B. Provide all paint and coating products from the same manufacturer to the greatest extent possible.
 1. If a single manufacturer cannot provide all specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.

C. Paints:

1. Glidden Professional, a product of PPG Architectural Coatings.
2. Benjamin Moore & Co.
3. Parker Paint Mfg Co Inc., a Comex Group company.
4. PPG Architectural Finishes, Inc.
5. Rodda.
6. Sherwin-Williams Company.
7. Primer Sealers: Same manufacturer as topcoat.
8. Block Fillers: Same manufacturer as topcoat.
9. Substitutions: See Section 01 6000 – Product Requirements.

2.2 PAINTING AND COATINGS - GENERAL

A. Painting and Coatings

1. Where MPI paint numbers are specified, provide products listed in Master Painters Institute Approved Product List, current edition available at www.paintinfo.com, for specified MPI categories, except as otherwise indicated.
2. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
4. Supply each coating material in quantity required to complete entire project's work from a single production run.
5. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

B. Primers

1. Use the best primer recommended by the top coat manufacturer.

C. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
3. 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.

D. Volatile Organic Compound (VOC) Content

1. Products shall comply with the most stringent VOC limits of authorities having jurisdiction and, for interior paints and coatings applied at Project site, the following VOC limits,

exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2. VOC Limits

- a. Flat Paints and Coatings: 50 g/L.
- b. Nonflat Paints and Coatings: 150 g/L.
- c. Dry-Fog Coatings: 400 g/L.
- d. Primers, Sealers, and Undercoaters: 200 g/L.
- e. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
- f. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
- g. Pretreatment Wash Primers: 420 g/L.
- h. Floor Coatings: 100 g/L.
- i. Shellacs, Clear: 730 g/L.
- j. Shellacs, Pigmented: 550 g/L.

E. Chemical Content

1. The following compounds are prohibited:

- a. Aromatic Compounds: In excess of 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
- b. Acrolein, acrylonitrile, antimony, benzene, butyl benzyl phthalate, cadmium, di
- c. (2-ethylhexyl) phthalate, di-n-butyl phthalate, di-n-octyl phthalate, 1,2-dichlorobenzene, diethyl phthalate, dimethyl phthalate, ethylbenzene, formaldehyde, hexavalent chromium, isophorone, lead, mercury, methyl ethyl ketone, methyl isobutyl ketone, methylene chloride, naphthalene, toluene (methylbenzene), 1,1,1-trichloroethane, vinyl chloride.

2.3 FINISHES

A. Sheen/Gloss Level

- 1. Provide the sheens specified.
- 2. Where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

B. Color

- 1. As indicated in Color Schedule.
- 2. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.
- 3. In utility areas, finish equipment, piping, conduit, and exposed duct work in colors according to the color-coding scheme indicated.

2.4 ACCESSORY MATERIAL

- A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

2.5 SCOPE OF WORK

- A. Paint/finish the following surfaces
 - 1. Items noted on the Paint Schedule.
 - 2. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
 - 3. Mechanical and Electrical:
 - a. In finished areas, paint all insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
 - b. In finished areas, paint shop-primed items.
 - c. Paint interior surfaces of air ducts that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
- B. Do not paint/finish the following surfaces
 - 1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
 - 5. Non-metallic roofing and flashing.
 - 6. Galvanized stairs, landings, and ramps.
 - 7. Stainless steel, anodized aluminum, bronze, terne, and lead items, unless otherwise indicated.
 - 8. Marble, granite, slate, and other natural stones.
 - 9. Floors, unless specifically so indicated.
 - 10. Ceramic and other tiles.
 - 11. Brick, architectural concrete, cast stone, integrally colored plaster and stucco.
 - 12. Glass.
 - 13. Acoustical materials, unless specifically so indicated.
 - 14. Concealed pipes, ducts, and conduits.

PART 3 EXECUTION

3.1 EXAMINATION

A. Site Verification of Conditions

1. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
2. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
3. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
4. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - a. Application of coating indicates acceptance of surfaces and conditions.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Masonry (Clay and CMU): 12 percent.
3. Wood: 15 percent.
4. Gypsum Board: 12 percent.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

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

1. Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Masonry Substrates

1. Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.

F. Steel Substrates

1. 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:
 - a. SSPC-SP 2, "Hand Tool Cleaning."
 - b. SSPC-SP 3, "Power Tool Cleaning."
 - c. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."

G. Shop-Primed Steel Substrates

1. Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

H. Galvanized-Metal Substrates

1. Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

I. Wood Substrates

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

J. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 INSTALLATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 FIELD QUALITY CONTROL

A. Tolerances

- 1. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 - a. Contractor shall touch up and restore painted surfaces damaged by testing.
 - b. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

3.6 PROTECTION

- A. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- B. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- C. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.7 SCHEDULES

A. Paint Systems - Interior

- 1. Ferrous Metals, Unprimed, Low-VOC Epoxy:
 - a. One coat of rust-inhibitive epoxy primer, MPI #301.
 - b. Semi-gloss: Two coats of latex epoxy enamel, MPI #215.
- 2. Galvanized Metals, Low-VOC Latex:
 - a. One coat galvanize primer, MPI 134.
 - b. Semi-gloss: Two coats of latex enamel, MPI #147.
- 3. Gypsum Board/Plaster, Wet Areas (restrooms, showers, kitchens, janitor's rooms, and where noted):
 - a. One coat of PVA epoxy primer sealer, MPI #50.
 - b. Semi-gloss: Two coats of epoxy enamel, MPI #215.
 - c. Apply primer prior to wall texture provided by 09 2116.
- 4. Gypsum Board/Plaster, Wood Panels, all other areas:
 - a. One coat of PVA primer sealer, MPI #50.

- b. Eggshell (Satin): One coat of latex enamel, MPI #146.
 - c. Apply primer prior to wall texture provided by 09 2116.
- B. Paint Systems – Exterior
 - 1. Wood or Fiber-Cement, Opaque, Latex, 3 Coat:
 - a. One coat of latex primer sealer, MPI # 6.
 - b. Semi-gloss: Two coats of latex enamel; MPI #15.
 - 2. Galvanized Metals, Latex, 3 Coat:
 - a. One coat epoxy primer MPI #101.
 - b. Semi-gloss: Two coats of aliphatic urethane MPI #72.

END OF SECTION

SECTION 10 1400

SIGNAGE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Restroom Signage

1.2 RELATED REQUIREMENTS

- A. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures.
- B. Section 01 3000 – Administrative Requirements: Submittal review procedures.
- C. Section 01 6000 – Product Requirements: Substitution request procedures.
- D. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.

1.3 REFERENCE STANDARDS

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- C. ICC A117.1 - Accessible and Usable Buildings and Facilities; International Code Council; 2009 (ANSI).
- D. OSSC - Oregon Structural Specialty Code, latest edition.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data
 - 1. Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.
- C. Shop Drawings
 - 1. Provide half-size layout drawing, to scale, indicating spacing between letters and words, space around edges, and relationship to mounting substrate.
 - 2. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
 - a. When room numbers to appear on signs differ from those on the drawings, include the drawing room number on schedule.
 - b. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
- D. Manufacturer's Installation Instructions
 - 1. Include installation templates and attachment devices.

- E. Samples
 - 1. Quantity: (2) of each type.
 - 2. Size: Actual size.

1.5 QUALITY ASSURANCE

- A. Qualifications
 - 1. Manufacturer Qualifications: Company specializing in performing the work of this section with minimum 3 years of experience.
- B. Regulatory Requirements
 - 1. Comply with the applicable requirements of Oregon Structural Specialty Code, latest edition.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Acceptance at Site
 - 1. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
- B. Storage
 - 1. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes.

1.7 PROJECT/SITE CONDITIONS

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
- B. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.1 PRODUCT GENERAL REQUIREMENTS

- A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1, including Braille, and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.

2.2 ROOM SIGNS GENERAL REQUIREMENTS

- A. General Requirements
 - 1. Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.
 - 2. Character Height: 1 inch; Raised
 - 3. Sign Height: 8 inches, unless otherwise indicated.
 - 4. Rest Rooms: Identify with pictograms, the names "MEN" and "WOMEN", and braille.
- B. Manufacturers
 - 1. Best Sign Systems, Inc.
 - 2. Mohawk Sign Systems, Inc.

3. Architectural Metalcrafters
4. ASI Sign Systems.
5. Eugene Sign and Awning.
6. Meyer Architectural Signs & Graphics.
7. Substitutions: See Section 01 6000 - Product Requirements.

C. Sign Types

1. Flat Signs: Signage media without frame.
 - a. Edges: Square.
 - b. Corners: Square.
 - c. Wall Mounting of One-Sided Signs: Tape adhesive.
 - d. Character Font: Helvetica, Arial, or other sans serif font.
 - e. Character Case: Upper case only.
 - f. Background Color: Blue.
 - g. Character Color: White on blue sign.
 - h. Size: 8 in. x 8 in.

2.3 ACCESSIBLE PARKING SIGNS

A. Regulatory Requirements

1. Comply with Oregon Transportation Commission Standards for Accessible Parking Places, August 2018 edition.

B. Description

1. Material: 18 gage bonderized steel or .080 inch aluminum.
2. Finish: Baked Enamel - both sides finished

C. Signage

1. Comply with regulatory requirements and the Drawings.

D. Manufacturer

1. Contractor's choice.

E. Accessories

1. Supports
 - a. 2 inch Inside diameter Galvanized Steel Post, unless otherwise shown on drawings.
2. Provide poles of sufficient length to mount bottom of sign 7 feet above finished grade at base of pole.
3. Mounting
 - a. Cast support post into concrete footing. Through bolt sign to post with tamperproof cadmium-plated fasteners.

F. Extent

1. Provide at accessible parking space shown on the Drawings.

2.4 ACCESSORIES

A. Concealed Screws

1. Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.

B. Exposed Screws

1. Stainless steel, tamper resistant.

C. Tape Adhesive

1. Double sided tape, permanent adhesive.

PART 3 EXECUTION

3.1 EXAMINATION

A. Site Verification of Conditions

1. Verify that substrate surfaces are ready to receive work.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install neatly, with horizontal edges level.

C. Protect from damage until Substantial Completion; repair or replace damage items.

3.3 SCHEDULES

A. Restroom Signs. (1) per room per room name on drawings.

B. Accessible Parking Signs: As required by reference standard per each parking space and loading zone.

END OF SECTION

SECTION 10 2113.19
PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Phenolic toilet compartments.

1.2 RELATED REQUIREMENTS

- A. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures.
- B. Section 01 3000 – Administrative Requirements: Submittal review procedures.
- C. Section 01 6000 – Product Requirements: Substitution request procedures.
- D. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.
- E. Section 06 1000 - Rough Carpentry: Blocking and supports.
- F. Section 10 2800 - Toilet Accessories.

1.3 REFERENCE STANDARDS

- A. OSSC - Oregon Structural Specialty Code, latest edition.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data
 - 1. Provide data on panel construction, hardware, and accessories, and installation requirements.
- C. Shop Drawings
 - 1. Indicate partition plan, elevation views, dimensions, details of wall supports, door swings.
- D. Samples
 - 1. Purpose: Select color
 - 2. Quantity: (2)
 - 3. Size: Standard size.

1.5 QUALITY ASSURANCE

- A. Qualifications
 - 1. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Acceptance at Site
 - 1. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.

B. Storage

1. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes.

1.7 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.1 PHENOLIC TOILET COMPARTMENTS

A. Product and Manufacturer – Basis of Design

1. Toilet Partitions: “Duraline 1082 Series Overhead-Braced” by Bobrick.
2. Urinal Screens: “Duraline 1085 Series Wall Hung” by Bobrick.

B. Other Acceptable Products and Manufacturers

1. Substitutions: See Section 01 6000 – Product Requirements.

C. Dimensions

1. See drawings for layout.

D. Description

1. Factory fabricated doors, pilasters, and divider panels made of solid phenolic core panels with integral melamine finish, floor-mounted headrail-braced.

E. Finishes

1. Color: Architect to select from available color

2.2 ACCESSORIES

A. Pilaster Shoes

1. Formed chromed steel with polished finish, 3 inch high, concealing floor fastenings.
2. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.

B. Head Rails

1. Hollow anodized aluminum, 1 inch by 1-1/2 inch size, with anti-grip profile and cast socket wall brackets.

C. Pilaster Brackets

1. Polished stainless steel.

D. Wall Brackets

1. Continuous type, polished stainless steel.

E. Attachments, Screws, and Bolts

1. Stainless steel, tamper proof type.
2. For attaching panels and pilasters to brackets: Through-bolts and nuts; tamper proof.

- F. Hardware: Polished stainless steel:
 - 1. Pivot hinges, gravity type, adjustable for door close positioning; two per door.
 - 2. Nylon bearings.
 - 3. Door Latch: Slide type with exterior emergency access feature.
 - 4. Door strike and keeper with rubber bumper; mounted on pilaster in alignment with door latch.
 - 5. Coat hook with rubber bumper; one per compartment, mounted on door.
 - 6. Provide door pull for out-swinging doors.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions
 - 1. Verify that field measurements are as indicated.
 - 2. Verify correct spacing of and between plumbing fixtures.
 - 3. Verify correct location of built-in framing, anchorage, and bracing.

3.2 INSTALLATION

- A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.
- B. Maintain 3/8 inch to 1/2 inch space between wall and panels and between wall and end pilasters.
- C. Attach panel brackets securely to walls using anchor devices.
- D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.
- E. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.3 FIELD QUALITY CONTROL

- A. Tolerances
 - 1. Maximum Variation From True Position: 1/4 inch.
 - 2. Maximum Variation From Plumb: 1/8 inch.
- B. Adjusting
 - 1. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.
 - 2. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.
 - 3. Adjust adjacent components for consistency of line or plane.

END OF SECTION

SECTION 10 2800
TOILET ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Accessories for toilet rooms.

1.2 RELATED REQUIREMENTS

- A. Section 01 1000 – Summary: OFOI Items
- B. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures.
- C. Section 01 3000 – Administrative Requirements: Submittal review procedures.
- D. Section 01 6000 – Product Requirements: Substitution request procedures.
- E. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.
- F. Section 10 2113.19 - Plastic Toilet Compartments.

1.3 REFERENCE STANDARDS

- A. ANSI/ICC A117.1 Accessible and Usable Buildings and Facilities, 2009.
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.
- C. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2015.
- D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- E. ASTM C1036 - Standard Specification for Flat Glass; 2011.
- F. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2008 (Reapproved 2013).
- G. OSSC - Oregon Structural Specialty Code, latest edition.

1.4 SYSTEM DESCRIPTION

- A. Systems Requirements
 - 1. Furnish inserts and anchoring devices which will be surface mounted or recessed in metal stud wall with ceramic tile for the installation of toilet accessories.
 - 2. Provide products of the same manufacturer for each type of accessory unit and for units exposed in the same areas, whenever possible.
 - 3. Stamped names or labels on exposed faces of units will not be permitted.
 - 4. Provide locks where indicated, with the same keying for each type of accessory units, in the project, wherever possible. Furnish two keys for each lock.
 - 5. Comply with all features of model numbers specified.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
 - B. Product Data
 - 1. Submit data on accessories describing size, finish, details of function, and attachment methods.
- 1.6 QUALITY ASSURANCE
- A. Qualifications
 - 1. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
 - B. Regulatory Requirements
 - 1. Comply with the applicable requirements of Oregon Structural Specialty Code, latest edition.
- 1.7 DELIVERY, STORAGE, AND HANDLING
- A. Acceptance at Site
 - 1. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
 - B. Storage
 - 1. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes.
- 1.8 SEQUENCING
- A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.
- 1.9 WARRANTY
- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- 1.10 PROJECT RECORD DOCUMENTS
- 1.11 EXTRA STOCK
- A. Store where directed by Owner.

PART 2 PRODUCTS

2.1 PRODUCT GENERAL REQUIREMENTS

- A. Product and Manufacturer – Basis of Design
 - 1. Products listed are made by Bobrick, unless noted otherwise.
- B. Other Acceptable Products and Manufacturers
 - 1. ASI - American Specialties, Inc.
 - 2. Bradley Corporation.
 - 3. Substitutions: See Section 01 6000 – Product Requirements.

C. Materials

1. Stainless Steel Sheet
 - a. ASTM A666, Type 304.
2. Stainless Steel Tubing
 - a. ASTM A269/A269M, Type 304 or 316.
3. Sheet Steel
 - a. Cold rolled, commercial quality, ASTM A366.
 - b. Surface preparation and metal pre-treatment as required for applied finish.
4. Galvanized Steel Sheet
 - a. ASTM A527, G60.
5. Chromium Plating
 - a. Nickel and chromium electro-deposited on metal, ASTM B456, Type SC2.
6. Galvanized Steel Mounting Devices
 - a. ASTM A386, hot-dip galvanized after fabrication.
7. Mirror Glass
 - a. Annealed float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.

D. Finishes

1. Stainless Steel
 - a. No. 4 Brushed finish, unless otherwise noted.
2. Galvanizing for Items Other than Sheet
 - a. Comply with ASTM A123/A123M; galvanize ferrous metal and fastening devices.

E. Accessories

1. Accessories – General
2. Keys
 - a. Provide two keys for each accessory to Owner; master key lockable accessories.
3. Adhesive: Two component epoxy type, waterproof, compliant with project VOC limitations.
4. Fasteners, Screws, and Bolts: Stainless Steel; tamper-proof; security type.

2.2 FABRICATION

- A. Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
- B. Grind welded joints smooth.
- C. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.

2.3 OFOI TOILET ACCESSORIES

- A. The following units will be provided by the Owner. Contractor to install blocking to accommodate.
- B. Toilet Paper Dispenser
- C. Soap Dispenser.

2.4 TOILET ROOM ACCESSORIES

- A. Toilet Paper Dispenser – Surface Mount
 - 1. Double roll, surface mounted bracket type, stainless steel .
 - 2. Attached Shelf
 - a. 0.03 inch satin finished stainless steel, with rolled or formed edge at front.
 - 3. Product
 - a. “B-2840” by Bobrick.
 - 4. Extent
 - a. (1) per toilet
- B. Mirrors
 - 1. Stainless steel framed, 1/4 inch thick annealed float glass; ASTM C1036.
 - 2. Size
 - a. 24 in. by 36 in.
 - 3. Frame, where indicated:
 - a. 0.05 in. angle shapes, with mitered and welded and ground corners, and tamperproof hanging system; No.4 finish.
 - 4. Backing
 - a. Full-mirror sized, minimum 0.03 in. galvanized steel sheet and nonabsorptive filler material.
 - 5. Product
 - a. “B-290” by Bobrick.
 - b. See Drawings.
- C. Seat Cover Dispenser
 - 1. Stainless steel, surface-mounted, reloading by concealed opening at base, tumbler lock.
 - 2. Minimum capacity: 250 seat covers.
 - 3. Product: “B-221” by Bobrick.
 - 4. Extent: (1) per water closet
- D. Grab Bars
 - 1. Stainless steel, nonslip grasping surface finish, Standard Duty Grab Bars.
 - 2. Push/Pull Point Load
 - a. 250 pound-force, minimum.

3. Dimensions
 - a. 1-1/4 inch outside diameter, minimum 0.05 inch wall thickness, exposed flange mounting, 1-1/2 inch clearance between wall and inside of grab bar.
4. Length and Configuration
 - a. As indicated on drawings.
5. Products:
 - a. "5806" by Bobrick.
6. Sizes
 - a. GB-1: 36 in.
 - b. GB-2: 42 in.
 - c. GB-3: 18 in.
7. Extent
 - a. (1) of each GB-1, GB-2, and GB-3 per accessible stall per the Drawings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions
 1. Verify exact location of accessories for installation.
 2. Verify installation of blocking, reinforcing plates, and concealed anchors in walls and ceilings.

3.2 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

3.3 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions in locations indicated on the drawings.
- B. Install plumb and level, securely and rigidly anchored to substrate, in locations indicated on drawings.
- C. Mounting Heights: As indicated on drawings and required by accessibility regulations, unless otherwise indicated.

3.4 PROTECTION

- A. Protect installed accessories from damage due to subsequent construction operations.

END OF SECTION

SECTION 10 4400
FIRE PROTECTION SPECIALITIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fire extinguishers
- B. Fire extinguisher cabinets.
- C. Accessories.

1.2 RELATED REQUIREMENTS

- A. Section 01 2000 – Price and Payment Procedures: Pay application process, change procedures.
- B. Section 01 3000 – Administrative Requirements: Submittal review procedures.
- C. Section 01 6000 – Product Requirements: Substitution request procedures.
- D. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.

1.3 REFERENCE STANDARDS

- A. NFPA 10 - Standard for Portable Fire Extinguishers; latest edition.
- B. OSSC - Oregon Structural Specialty Code, latest edition.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data
 - 1. Submit manufacturer's product data and installation instructions.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Acceptance at Site
 - 1. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
- B. Storage
 - 1. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes.

1.6 PROJECT/SITE CONDITIONS

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.1 PRODUCT GENERAL REQUIREMENTS

- A. Manufacturers – Basis of Design

1. JL Industries, Inc.
 - B. Other Acceptable Products and Manufacturers
 1. Ansul, a Tyco Business.
 2. Larsen's Manufacturing Co.
 3. Potter-Roemer.
 4. Pyro-Chem, a Tyco Business.
 5. Substitutions: See Section 01 6000 – Product Requirements.
- 2.2 FIRE EXTINGUISHERS
- A. Description
 1. Multi-Purpose Dry Chemical Type Fire Extinguishers.
 2. Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
 3. Heavy duty steel tank, with pressure gage.
 4. UL Class: A:B:C.
 5. 4A-80BC, 10 pound (Similar to JL "Cosmic 10E").
 6. Finish: Factory powder-coated; Red.
 7. Contents
 - a. Fluidized and siliconized mono ammonium phosphate powder; nonconductive and nontoxic
 - B. Extent
 1. Provide extinguisher in each cabinet and elsewhere where shown on Drawings.
- 2.3 FIRE EXTINGUISHER CABINETS
- A. Product and Manufacturer – Basis of Design
 1. “Cosmopolitan 1036V10 with View Window” by JL Industries.
 2. Substitutions: See Section 01 6000 – Product Requirements.
 - B. Description
 1. Cabinet Configuration: Recessed type.
 2. Sized to accommodate extinguisher and accessories.
 - C. Materials
 1. Tub
 - a. Primed sheet steel, powder-coated finish.
 2. Door
 - a. 0.036 inch thick stainless steel reinforced for flatness and rigidity; latch. Hinge doors for 180 degree opening with continuous piano hinge. Provide nylon catch.
 3. Door Glazing

- a. Float glass, clear, 1/8 inch thick, and set in resilient channel glazing gasket.
 - 4. Cabinet Mounting Hardware
 - a. Appropriate to cabinet, with pre-drilled holes for placement of anchors.
 - 5. Weld, fill, and grind components smooth.
 - D. Finishes
 - 1. Cabinet Exterior Trim and Door
 - a. No. 4 - Brushed stainless steel.
 - 2. Cabinet Interior
 - a. White colored enamel.
 - E. Extent
 - 1. Where "FEC" is noted on the Code Diagram Sheet and/or Floor Plan Drawing, or elsewhere as shown on the Drawings.
- 2.4 ACCESSORIES
- A. Extinguisher Brackets
 - 1. Formed steel, galvanized and enamel finished, red.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions
 - 1. Verify existing conditions before starting work.
 - 2. Verify rough openings for cabinet are correctly sized and located.

3.2 PREPARATION

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install cabinets plumb and level in wall openings, maximum 54 inches from finished floor to inside top of cabinet.
- C. Secure rigidly in place.
- D. Place extinguishers in cabinets.

3.4 FIELD QUALITY CONTROL

- A. Ensure that each extinguisher is fully charged, and that inspection of each extinguisher has been performed, as evidenced by the National Association of Fire Equipment Distributors certification tag, just prior to turnover.

END OF SECTION

SECTION 230593

TESTING, ADJUSTING, AND BALANCING FOR HVAC

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. Balancing Air Systems:
 - a. Constant-volume air systems.
 - b. Dual-duct systems.
 - c. Variable-air-volume systems.
 - d. Multizone systems.
 - e. Induction-unit systems.

1.3 DEFINITIONS

- A. AABC: Associated Air Balance Council.
- B. BAS: Building automation systems.
- C. NEBB: National Environmental Balancing Bureau.
- D. TAB: Testing, adjusting, and balancing.
- E. TABB: Testing, Adjusting, and Balancing Bureau.
- F. TAB Specialist: An independent entity meeting qualifications to perform TAB work.
- G. TDH: Total dynamic head.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: Within 30 days of Contractor's Notice to Proceed, submit documentation that the TAB specialist and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.
- B. Certified TAB reports.

1.5 QUALITY ASSURANCE

- A. TAB Specialists Qualifications: Certified by NEBB or TABB.
 - 1. TAB Field Supervisor: Employee of the TAB specialist and certified by NEBB or TABB.
 - 2. TAB Technician: Employee of the TAB specialist and certified NEBB or TABB as a TAB technician.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems designs that may preclude proper TAB of systems and equipment.
- B. Examine installed systems for balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are applicable for intended purpose and are accessible.
- C. Examine the approved submittals for HVAC systems and equipment.
- D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- E. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.
- F. Examine equipment performance data including fan and pump curves.

1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
 2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.
- G. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- H. Examine test reports specified in individual system and equipment Sections.
- I. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, filters are clean, and equipment with functioning controls is ready for operation.
- J. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.
- K. Examine strainers. Verify that startup screens have been replaced by permanent screens with indicated perforations.
- L. Examine control valves for proper installation for their intended function of throttling, diverting, or mixing fluid flows.
- M. Examine heat-transfer coils for correct piping connections and for clean and straight fins.
- N. Examine system pumps to ensure absence of entrained air in the suction piping.
- O. Examine operating safety interlocks and controls on HVAC equipment.
- P. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.
- 3.2 GENERAL PROCEDURES FOR TESTING AND BALANCING
- A. Perform testing and balancing procedures on each system according to the procedures contained in ASHRAE 111, NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems", or SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing" and in this Section.

- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.
 - 1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
 - 2. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Section 230713 "Duct Insulation," Section 230716 "HVAC Equipment Insulation."
- C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.3 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Cross-check the summation of required outlet volumes with required fan volumes.
- B. Prepare schematic diagrams of systems' "as-built" duct layouts.
- C. For variable-air-volume systems, develop a plan to simulate diversity.
- D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.
- E. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.
- F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- G. Verify that motor starters are equipped with properly sized thermal protection.
- H. Check dampers for proper position to achieve desired airflow path.
- I. Check for airflow blockages.
- J. Check condensate drains for proper connections and functioning.
- K. Check for proper sealing of air-handling-unit components.
- L. Verify that air duct system is sealed as specified in Section 233113 "Metal Ducts."

3.4 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
 - 1. Measure total airflow.
 - a. Set outside-air, return-air, and relief-air dampers for proper position that simulates minimum outdoor-air conditions.
 - b. Where duct conditions allow, measure airflow by main Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses, close to the fan and prior to any outlets, to obtain total airflow.
 - c. Where duct conditions are not suitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.
 - 2. Measure fan static pressures as follows:
 - a. Measure static pressure directly at the fan outlet or through the flexible connection.
 - b. Measure static pressure directly at the fan inlet or through the flexible connection.
 - c. Measure static pressure across each component that makes up the air-handling system.
 - d. Report artificial loading of filters at the time static pressures are measured.
 - 3. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
 - 4. Obtain approval from **Architect** for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
 - 5. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload occurs. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.
- B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows.
 - 1. Measure airflow of submain and branch ducts.
 - 2. Adjust submain and branch duct volume dampers for specified airflow.
 - 3. Re-measure each submain and branch duct after all have been adjusted.
- C. Adjust air inlets and outlets for each space to indicated airflows.

1. Set airflow patterns of adjustable outlets for proper distribution without drafts.
2. Measure inlets and outlets airflow.
3. Adjust each inlet and outlet for specified airflow.
4. Re-measure each inlet and outlet after they have been adjusted.

D. Verify final system conditions.

1. Re-measure and confirm that minimum outdoor, return, and relief airflows are within design. Readjust to design if necessary.
2. Re-measure and confirm that total airflow is within design.
3. Re-measure all final fan operating data, rpms, volts, amps, and static profile.
4. Mark all final settings.
5. Test system in economizer mode. Verify proper operation and adjust if necessary.
6. Measure and record all operating data.
7. Record final fan-performance data.

3.5 TOLERANCES

A. Set HVAC system's airflow rates and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
2. Air Outlets and Inlets: Plus or minus 10 percent.

B. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.

3.6 FINAL REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
2. Include a list of instruments used for procedures, along with proof of calibration.
3. Certify validity and accuracy of field data.

B. Final Report Contents: In addition to certified field-report data, include the following:

1. Pump curves.
2. Fan curves.
3. Manufacturers' test data.
4. Field test reports prepared by system and equipment installers.

5. Other information relative to equipment performance; do not include Shop Drawings and Product Data.
- C. General Report Data: In addition to form titles and entries, include the following data:
1. Title page.
 2. Name and address of the TAB specialist.
 3. Project name.
 4. Project location.
 5. Architect's name and address.
 6. Engineer's name and address.
 7. Contractor's name and address.
 8. Report date.
 9. Signature of TAB supervisor who certifies the report.
 10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
 11. Summary of contents including the following:
 - a. Indicated versus final performance.
 - b. Notable characteristics of systems.
 - c. Description of system operation sequence if it varies from the Contract Documents.
 12. Nomenclature sheets for each item of equipment.
 13. Data for terminal units, including manufacturer's name, type, size, and fittings.
 14. Notes to explain why certain final data in the body of reports vary from indicated values.
 15. Test conditions for fans and pump performance forms including the following:
 - a. Settings for outdoor-, return-, and exhaust-air dampers.
 - b. Conditions of filters.
 - c. Cooling coil, wet- and dry-bulb conditions.
 - d. Face and bypass damper settings at coils.
 - e. Fan drive settings including settings and percentage of maximum pitch diameter.
 - f. Inlet vane settings for variable-air-volume systems.
 - g. Settings for supply-air, static-pressure controller.
 - h. Other system operating conditions that affect performance.
- D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:
1. Quantities of outdoor, supply, return, and exhaust airflows.
 2. Water and steam flow rates.
 3. Duct, outlet, and inlet sizes.
 4. Pipe and valve sizes and locations.

5. Terminal units.
 6. Balancing stations.
 7. Position of balancing devices.
- E. Air-Terminal-Device Reports:
1. Unit Data:
 - a. System and air-handling unit identification.
 - b. Location and zone.
 - c. Apparatus used for test.
 - d. Area served.
 - e. Make.
 - f. Number from system diagram.
 - g. Type and model number.
 - h. Size.
 - i. Effective area in sq. ft..
 2. Test Data (Indicated and Actual Values):
 - a. Airflow rate in cfm.
 - b. Air velocity in fpm.
 - c. Preliminary airflow rate as needed in cfm.
 - d. Preliminary velocity as needed in fpm.
 - e. Final airflow rate in cfm.
 - f. Final velocity in fpm.
 - g. Space temperature in deg F.

END OF SECTION

SECTION 23 07 13

DUCT INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes insulating the following duct services:
 - 1. Indoor, concealed supply and outdoor air.
 - 2. Indoor, exposed supply and outdoor air.
 - 3. Indoor, concealed return located in unconditioned space.
 - 4. Indoor, exposed return located in unconditioned space.
- B. Related Sections:
 - 1. Section 230716 "HVAC Equipment Insulation."
 - 2. Section 230719 "HVAC Piping Insulation."
 - 3. Section 233113 "Metal Ducts" for duct liners.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied if any).
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
 - 2. Detail insulation application at elbows, fittings, dampers, specialties and flanges for each type of insulation.
 - 3. Detail application of field-applied jackets.
 - 4. Detail application at linkages of control devices.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.

1.5 QUALITY ASSURANCE

- A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
 - 1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
 - 2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.6 COORDINATION

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."
- B. Coordinate clearance requirements with duct Installer for duct insulation application. Before preparing ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.7 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in "Duct Insulation Schedule, General," "Indoor Duct and Plenum Insulation Schedule," and "Aboveground, Outdoor Duct and Plenum Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
 - 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. Aeroflex USA, Inc.
 - b. Armacell LLC.
 - c. K-Flex USA.
- F. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type I Type II with factory-applied vinyl jacket Type III with factory-applied FSK jacket Type III with factory-applied FSP jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
 - 1. Manufacturers: Subject to compliance with requirements available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. CertainTeed Corporation.
 - b. Johns Manville; a Berkshire Hathaway company.
 - c. Knauf Insulation.
 - d. Manson Insulation Inc.
 - e. Owens Corning.
 - f. .

2.2 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.
- B. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.
 - 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. Aeroflex USA, Inc.
 - b. Armacell LLC.
 - c. Foster Brand; H. B. Fuller Construction Products.
 - d. K-Flex USA.
- C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
 - 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. Childers Brand; H. B. Fuller Construction Products.
 - b. Eagle Bridges - Marathon Industries.
 - c. Foster Brand; H. B. Fuller Construction Products.
 - d. Mon-Eco Industries, Inc.
- D. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
 - 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. Childers Brand; H. B. Fuller Construction Products.
 - b. Eagle Bridges - Marathon Industries.
 - c. Foster Brand; H. B. Fuller Construction Products.
 - d. Mon-Eco Industries, Inc.
- E. PVC Jacket Adhesive: Compatible with PVC jacket.
 - 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. Dow Corning Corporation.
- b. Johns Manville; a Berkshire Hathaway company.
- c. P.I.C. Plastics, Inc.
- d. Speedline Corporation.

2.3 MASTICS AND COATINGS

- A. Materials shall be compatible with insulation materials, jackets, and substrates.
 1. VOC Content: 300 g/L or less.
 2. Low-Emitting Materials: Mastic coatings shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Vapor-Retarder Mastic: Water based; suitable for indoor use on below ambient services.
 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. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - c. Knauf Insulation.
 - d. Vimasco Corporation.
 2. Water-Vapor Permeance: Comply with ASTM C 755, Section 7.2.2, Table 2, for insulation type and service conditions.
 3. Service Temperature Range: Minus 20 to plus 180 deg F.
 4. Color: White Insert color.
- C. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.
 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. Childers Brand; H. B. Fuller Construction Products.
 - b. Eagle Bridges - Marathon Industries.
 - c. Foster Brand; H. B. Fuller Construction Products.
 - d. Knauf Insulation.
 - e. Mon-Eco Industries, Inc.
 - f. Vimasco Corporation.

2. Water-Vapor Permeance: ASTM E 96, greater than 1.0 perm at manufacturer's recommended dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F.
4. Color: White Insert color.

2.4 LAGGING ADHESIVES

- A. Description: Comply with MIL-A-3316C, Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.
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. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - c. Vimasco Corporation.
 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
 3. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over duct insulation.
 4. Service Temperature Range: 0 to plus 180 deg F.
 5. Color: White.

2.5 SEALANTS

- A. FSK and Metal Jacket Flashing Sealants:
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. Childers Brand; H. B. Fuller Construction Products.
 - b. Eagle Bridges - Marathon Industries.
 - c. Foster Brand; H. B. Fuller Construction Products.
 - d. Mon-Eco Industries, Inc.
 2. Materials shall be compatible with insulation materials, jackets, and substrates.
 3. Fire- and water-resistant, flexible, elastomeric sealant.
 4. Service Temperature Range: Minus 40 to plus 250 deg F.
 5. Color: Aluminum.

6. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. ASJ Flashing Sealants, and Vinyl and PVC Jacket Flashing Sealants:
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. Childers Brand; H. B. Fuller Construction Products.
 2. Materials shall be compatible with insulation materials, jackets, and substrates.
 3. Fire- and water-resistant, flexible, elastomeric sealant.
 4. Service Temperature Range: Minus 40 to plus 250 deg F.
 5. Color: White.
 6. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
 2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
 3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
 4. FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene backing; complying with ASTM C 1136, Type II.
 5. Vinyl Jacket: White vinyl with a permeance of **1.3 perms** when tested according to ASTM E 96/E 96M, Procedure A, and complying with NFPA 90A and NFPA 90B.
- 2.6 FIELD-APPLIED JACKETS
- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
 - B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.

- C. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
 - 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. Johns Manville; a Berkshire Hathaway company.
 - b. P.I.C. Plastics, Inc.
 - c. Proto Corporation.
 - d. Speedline Corporation.
 - 2. Adhesive: As recommended by jacket material manufacturer.
 - 3. Color: White Color-code jackets based on system. Color as selected by Architect.

D. Metal Jacket:

- 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. ITW Insulation Systems; Illinois Tool Works, Inc.
 - b. RPR Products, Inc.
- 2. Aluminum Jacket: Comply with ASTM B 209, Alloy 3003, 3005, 3105, or 5005, Temper H-14.
 - a. Sheet and roll stock ready for shop or field sizing
 - b. Finish and thickness are indicated in field-applied jacket schedules.
 - c. Moisture Barrier for Indoor Applications: 1-mil- thick, heat-bonded polyethylene and kraft paper 3-mil- thick, heat-bonded polyethylene and kraft paper 2.5-mil- thick polysurlyn.
 - d. Moisture Barrier for Outdoor Applications: 3-mil- thick, heat-bonded polyethylene and kraft paper 2.5-mil- thick polysurlyn.

2.7 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.
 - 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. Avery Dennison Corporation, Specialty Tapes Division.

- b. Compac Corporation.
 - c. Ideal Tape Co., Inc., an American Biltrite Company.
 - d. Knauf Insulation.
 - e. Venture Tape.
 - 2. Width: 3 inches.
 - 3. Thickness: 11.5 mils.
 - 4. Adhesion: 90 ounces force/inch in width.
 - 5. Elongation: 2 percent.
 - 6. Tensile Strength: 40 lbf/inch in width.
 - 7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
- 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. Avery Dennison Corporation, Specialty Tapes Division.
 - b. Compac Corporation.
 - c. Ideal Tape Co., Inc., an American Biltrite Company.
 - d. Knauf Insulation.
 - e. Venture Tape.
 - 2. Width: 3 inches.
 - 3. Thickness: 6.5 mils.
 - 4. Adhesion: 90 ounces force/inch in width.
 - 5. Elongation: 2 percent.
 - 6. Tensile Strength: 40 lbf/inch in width.
 - 7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.
- C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.
- 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. Compac Corporation.
 - b. Ideal Tape Co., Inc., an American Biltrite Company.
 - c. Venture Tape.
 - d. Insert manufacturer's name.
 - 2. Width: 2 inches.
 - 3. Thickness: 6 mils.
 - 4. Adhesion: 64 ounces force/inch in width.

5. Elongation: 500 percent.
 6. Tensile Strength: 18 lbf/inch in width.
- D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.
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. Avery Dennison Corporation, Specialty Tapes Division.
 - b. Compac Corporation.
 - c. Ideal Tape Co., Inc., an American Biltrite Company.
 - d. Knauf Insulation.
 - e. Venture Tape.
 2. Width: 2 inches.
 3. Thickness: 3.7 mils.
 4. Adhesion: 100 ounces force/inch in width.
 5. Elongation: 5 percent.
 6. Tensile Strength: 34 lbf/inch in width.

2.8 SECUREMENTS

A. Bands:

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. ITW Insulation Systems; Illinois Tool Works, Inc.
 - b. RPR Products, Inc.
2. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 304 Type 316; 0.015 inch thick, 1/2 inch 3/4 inch wide with wing seal closed seal.
3. Aluminum: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch 3/4 inch wide with wing seal closed seal.

B. Insulation Pins and Hangers:

1. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:

- 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) AGM Industries, Inc.
 - 2) Gemco.
 - 3) Midwest Fasteners, Inc.
 - 4) .
 - b. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
 - c. Spindle: Copper- or zinc-coated, low-carbon steel Aluminum Stainless steel, fully annealed, 0.106-inch- diameter shank, length to suit depth of insulation indicated.
 - d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
2. Self-Sticking-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
- 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) AGM Industries, Inc.
 - 2) Gemco.
 - 3) Hardcast, Inc.
 - 4) Midwest Fasteners, Inc.
 - b. Baseplate: Galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
 - c. Spindle: Copper- or zinc-coated, low-carbon steel Aluminum Stainless steel, fully annealed, 0.106-inch- diameter shank, length to suit depth of insulation indicated.
 - d. Adhesive-backed base with a peel-off protective cover.
3. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick, galvanized-steel aluminum stainless-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
- 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) AGM Industries, Inc.
 - 2) Gemco.
 - 3) Hardcast, Inc.
 - 4) Midwest Fasteners, Inc.
 - 5) Nelson Stud Welding.
- b. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.
4. Nonmetal Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick nylon sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
- 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) Gemco.
 - 2) Midwest Fasteners, Inc.
- C. Staples: Outward-clinching insulation staples, nominal 3/4-inch-wide, stainless steel or Monel.
- D. Wire: stainless steel 0.062-inch soft-annealed.
- 2.9 CORNER ANGLES
- A. PVC Corner Angles: 30 mils Insert dimension thick, minimum 1 by 1 inch, PVC according to ASTM D 1784, Class 16354-C. White or color-coded to match adjacent surface.
 - B. Aluminum Corner Angles: 0.040 inch Insert dimension thick, minimum 1 by 1 inch, aluminum according to ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
 1. Verify that systems to be insulated have been tested and are free of defects.
 2. Verify that surfaces to be insulated are clean and dry.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.
- B. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Keep insulation materials dry during application and finishing.
- G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- H. Install insulation with least number of joints practical.
- I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
 - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
- J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- K. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth.

2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches o.c.
 - a. For below ambient services, apply vapor-barrier mastic over staples.
 4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct flanges and fittings.
- L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.4 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
 4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.

3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
 4. Seal jacket to wall flashing with flashing sealant.
- C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.
1. Comply with requirements in Section 078413 "Penetration Firestopping."
- E. Insulation Installation at Floor Penetrations:
1. Duct: For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches.
 2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.5 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.6 INSTALLATION OF MINERAL-FIBER INSULATION

- A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.
1. Apply adhesives according to manufacturer's recommended coverage rates per unit area.
 2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
 3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
 - a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.

- b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
 - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
 - d. Do not overcompress insulation during installation.
 - e. Impale insulation over pins and attach speed washers.
 - f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
- a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
 - b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.
5. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.
6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.
- B. Board Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.
- 1. Apply adhesives according to manufacturer's recommended coverage rates per unit area.
 - 2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.

3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
 - a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
 - b. On duct sides with dimensions larger than 18 inches, space pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
 - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
 - d. Do not overcompress insulation during installation.
 - e. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
 - a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
 - b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.
5. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
6. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.7 FIELD-APPLIED JACKET INSTALLATION

- A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.
 - 1. Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.
 - 2. Embed glass cloth between two 0.062-inch- thick coats of lagging adhesive.
 - 3. Completely encapsulate insulation with coating, leaving no exposed insulation.
- B. Where FSK jackets are indicated, install as follows:
 - 1. Draw jacket material smooth and tight.
 - 2. Install lap or joint strips with same material as jacket.
 - 3. Secure jacket to insulation with manufacturer's recommended adhesive.
 - 4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch- wide joint strips at end joints.
 - 5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.
- C. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications, install with longitudinal seams along top and bottom of tanks and vessels. Seal with manufacturer's recommended adhesive.
 - 1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.
- D. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

3.8 FIRE-RATED INSULATION SYSTEM INSTALLATION

- A. Where fire-rated insulation system is indicated, secure system to ducts and duct hangers and supports to maintain a continuous fire rating.
- B. Insulate duct access panels and doors to achieve same fire rating as duct.
- C. Install firestopping at penetrations through fire-rated assemblies. Fire-stop systems are specified in Section 078413 "Penetration Firestopping."

3.9 FINISHES

- A. Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
 - 1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
 - a. Finish Coat Material: Interior, flat, latex-emulsion size.
- B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.
- C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.
- D. Do not field paint aluminum or stainless-steel jackets.

3.10 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. Inspect ductwork, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to one location(s) for each duct system defined in the "Duct Insulation Schedule, General" Article.
- C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.11 DUCT INSULATION SCHEDULE, GENERAL

- A. Plenums and Ducts Requiring Insulation:
 - 1. Indoor, concealed supply and outdoor air.
 - 2. Indoor, exposed supply and outdoor air.
 - 3. Indoor, concealed return located in unconditioned space.
 - 4. Indoor, concealed exhaust between isolation damper and penetration of building exterior.
 - 5. Indoor, exposed exhaust between isolation damper and penetration of building exterior.

- B. Items Not Insulated:
 - 1. Metal ducts with duct liner of sufficient thickness to comply with energy code and ASHRAE/IESNA 90.1.
 - 2. Factory-insulated flexible ducts.
 - 3. Factory-insulated plenums and casings.
 - 4. Flexible connectors.
 - 5. Vibration-control devices.
 - 6. Factory-insulated access panels and doors.

3.12 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

- A. Duct noted above to be insulated shall be one of the following:
 - 1. Mineral-Fiber Blanket: 2 inches thick and 1.5-lb/cu. Ft nominal density.
 - 2. Mineral-Fiber Board: 2 inches thick and 2-lb/cu. ft nominal density.

3.13 INDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Ducts and Plenums, Concealed:
 - 1. None.
- D. Ducts and Plenums, Exposed in an area subject to damage:
 - 1. PVC, White: 20 mils thick.
 - 2. Aluminum, Smooth: 0.020 inch thick.

END OF SECTION

SECTION 23 31 13

METAL DUCTS

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. Single-wall rectangular ducts and fittings.
 - 2. Single-wall round ducts and fittings.
 - 3. Sheet metal materials.
 - 4. Sealants and gaskets.
 - 5. Hangers and supports.
 - 6. Seismic-restraint devices.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of the following products:
 - 1. Liners and adhesives.
 - 2. Sealants and gaskets.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and with performance requirements and design criteria indicated in "Duct Schedule" Article.
- B. Airstream Surfaces: Surfaces in contact with airstream shall comply with requirements in ASHRAE 62.1.

- C. Duct Dimensions: Unless otherwise indicated, all duct dimensions indicated on Drawings are inside clear dimensions and do not include insulation or duct wall thickness.

2.2 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
 - 1. Construct ducts of galvanized sheet steel unless otherwise indicated.
- B. Transverse Joints: Fabricate joints in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 1. For ducts with longest side less than 36 inches, select joint types in accordance with Figure 2-1.
 - 2. For ducts with longest side 36 inches or greater, use flange joint connector Type T-22, T-24, T-24A, T-25a, or T-25b. Factory-fabricated flanged duct connection system may be used if submitted and approved by engineer of record.
- C. Longitudinal Seams: Select seam types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Ch. 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SINGLE-WALL ROUND DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Ch. 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.
 - 1. Construct ducts of galvanized sheet steel unless otherwise indicated.

- B. Transverse Joints: Select joint types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- C. Longitudinal Seams: Select seam types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- D. Tees and Laterals: Select types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.4 SHEET METAL MATERIALS

- A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
 - 1. Galvanized Coating Designation: G60 G90.
 - 2. Finishes for Surfaces Exposed to View: Mill phosphatized.
- C. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
 - 1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.
- D. Tie Rods: Galvanized steel, 1/4-inch- minimum diameter for lengths 36 inches or less; 3/8-inch- minimum diameter for lengths longer than 36 inches.

2.5 SEALANT AND GASKETS

- A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested in accordance with UL 723; certified by an NRTL.

B. Two-Part Tape Sealing System:

1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
2. Tape Width: 3 inches 4 inches 6 inches.
3. Sealant: Modified styrene acrylic.
4. Water resistant.
5. Mold and mildew resistant.
6. Maximum Static-Pressure Class: 10 inch wg, positive and negative.
7. Service: Indoor and outdoor.
8. Service Temperature: Minus 40 to plus 200 deg F.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
10. Sealant shall have a VOC content of 420 g/L or less.

C. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10 inch wg, positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

D. Solvent-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Base: Synthetic rubber resin.
3. Solvent: Toluene and heptane.
4. Solids Content: Minimum 60 percent.
5. Shore A Hardness: Minimum 60.
6. Water resistant.
7. Mold and mildew resistant.
8. Sealant shall have a VOC content of 420 g/L or less.
9. Maximum Static-Pressure Class: 10-inch wg, positive or negative.
10. Service: Indoor or outdoor.
11. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

2.6 HANGERS AND SUPPORTS

- A. Hanger Rods for Noncorrosive Environments: Galvanized-steel rods and nuts.
- B. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."
- C. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.
- D. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.
- E. Steel Cable End Connections: Galvanized-steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.
- F. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- G. Trapeze and Riser Supports:
 - 1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
 - 2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
 - 3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and coordination drawings.
- B. Install ducts in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- C. Install ducts in maximum practical lengths with fewest possible joints.
- D. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
- E. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

- F. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- G. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- H. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.
- I. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.
- J. Protect duct interiors from moisture, construction debris and dust, and other foreign materials both before and after installation.
- K. Elbows: Use long-radius elbows wherever they fit.
 - 1. Fabricate 90-degree rectangular mitered elbows to include turning vanes.
 - 2. Fabricate 90-degree round elbows with a minimum of three segments for 12 inches and smaller and a minimum of five segments for 14 inches and larger.
- L. Branch Connections: Use lateral or conical branch connections.

3.2 INSTALLATION OF EXPOSED DUCTWORK

- A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.
- B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.
- C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.
- D. Maintain consistency, symmetry, and uniformity in arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.
- E. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.3 DUCT SEALING

- A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

- B. Seal ducts at a minimum to the following seal classes in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":

- 1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

3.4 HANGER AND SUPPORT INSTALLATION

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."

- B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

- 1. Where practical, install concrete inserts before placing concrete.
 - 2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
 - 3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
 - 4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.

- C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.

- D. Hangers Exposed to View: Threaded rod and angle or channel supports.

- E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.

- F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.5 CONNECTIONS

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 FIELD QUALITY CONTROL

- A. Perform tests and inspections.

- B. Duct System Cleanliness Tests:
 - 1. Visually inspect duct system to ensure that no visible contaminants are present.
- C. Duct system will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

3.7 DUCT CLEANING

- A. Clean new duct system(s) before testing, adjusting, and balancing.

END OF SECTION

SECTION 26 0000

COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Electrical materials and installation instruction common to most electrical systems and components including but not limited to: equipment, raceways, fittings, sleeve/seals, sleeves, wires & connectors, conductors, demolition, equipment installation requirements common to equipment sections, painting and finishing, supports and anchorages, general coordination, electrical wiring and device coordination.

1.2 DEFINITIONS

- A. Following is a list of abbreviations generally used in Division 26.
1. AHJ – Authority Having Jurisdiction.
 2. ETL – Electric Testing Laboratories.
 3. NEC – National Electric Code.
 4. NEMA – National Electrical Manufacturers Association.
 5. NFPA – National Fire Protection Association.
 6. OSHA – Occupational Safety and Health Administration.
 7. UL – Underwriters Laboratories Inc.
- B. Terms used on the drawings or in the specifications shall have the following meanings:
1. Approved Equal: An Item suggested by the Contractor that is allowed by the Engineer to replace an item listed in the Specifications or Drawings. The burden of proof of equality is the responsibility of the Contractor.
 2. Furnish: Supply and deliver, ready for installation, assembly or intended use, all materials, labor, equipment, testing apparatus, controls, tests, accessories, and all other items customarily required for the proper and complete application for the particular work referred to.
 3. Install: Includes unloading, unpacking, assembling, erecting, installation, applying, finishing, protecting, cleaning and similar operations at the project site as required to complete all items of work as required for the intended use/operation including all testing, certification, commissioning, and other requirements for final turnover to the Owner.
 4. Provide: "Furnish" and "Install".
 5. Owner Furnished, Contractor Installed: The Owner will furnish at his cost and the Contractor shall receive, protect, store and install in the performance of the Work.
 6. Finished Spaces: Spaces other than electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
 7. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
 8. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include installations above ceilings, in shafts, trenches, partitions, or other enclosures.
 9. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations embedded in or below masonry or concrete construction, earthwork/trenches, within unheated shelters, crawl spaces or enclosures.

10. Wiring: All wires, raceways, fittings, conductors, connectors, tape, junction and outlet boxes, connectors, splices, and all other items necessary and/or required in connection with such work.
11. Raceway: All raceways, conduit, fittings, hangers, supports, sleeves, etc.

1.3 GENERAL REQUIREMENTS

- A. Examine the Drawings, specifications and other Contract Documents relating to the Work and the work of all trades and become fully informed as to the extent and character of work required. Coordinate all work with that of others to ensure proper and complete installation of all materials, equipment and supports. It is the intent of the drawings, specifications and related contract Documents to provide a complete working installation of all systems and equipment called for, in proper operating condition, finished, tested and ready for its intended use (hereinafter "Design Intent"). Provide all items not specifically shown on the drawings, called for in the specifications or related Contract Documents, but required to conform to the labor, material and equipment to achieve the Design Intent all and scaffolding, access provisions, tools, appliances, consumables, fees, permits and licenses, debris removal/disposal, supervision and labor, including required start-up, check-out and training to provide complete and fully operable systems in full compliance with the Contract Documents.
- B. Before submitting a bid and prior to the start of work, Contractor shall examine all conditions relating to the Work, including that associated with the work of other trades upon which Contractor's work may rely or otherwise depend, to achieve the Design Intent, in accordance with the best trade practices, workmanship and highest quality product installation, taking into account the sequence of the work, delivery, storage and hoisting requirements, requirements for access, testing and temporary services and all other site limitations and project complexities. Report to the Architect/Engineer any conditions which might prevent installation of materials and/or equipment in the manner intended by the Contract Documents or contrary to applicable codes, standards or regulations.
- C. No consideration or allowance will be granted for any alleged misunderstanding of materials, equipment or components to be furnished or work to be done; it being agreed that tender of proposal carries with it agreement to items, terms and conditions required by the Contract Documents.
- D. Site Visit – Visit the site and verify the exact conditions relating to the work and obtain such information as may be necessary to present a complete and comprehensive bid. No allowance will be made for any extra expense due to Contractor's failure to make such a visit and reasonably verify all actual/existing conditions. In the event of a conflict between existing conditions and the requirements of the Contract Documents, perform the necessary work to conform to Design Intent. The Owner or his representative will be the sole individual to interpret the intent of the Drawings in the event of a conflict between (1) existing conditions and those shown on the drawings, or (2) quality of existing material and quality of material indicated on the drawings or in the specifications. Wherever a conflict such as this occurs, the higher standard shall prevail.

1.4 SUBMITTALS

- A. Reference Division 1 for submittal requirements.
- B. Catalog Cuts & Submittal Literature

Catalog cuts, submittal literature and published material may be included to supplement scale drawings.

- 1. Prepare submittals electronically in accordance with the following and Division 1
 - 2. Submittal literature, drawings and diagrams shall be specifically applicable to this project and shall not contain extraneous material or optional choices. Clearly mark literature to indicate the proposed item. Substitutions: Comply with Division 1 Product Substitution Procedures.
- C. Shop Drawings:
 - 1. Shop drawings shall include all significant Division systems, equipment and components, including but not limited to all terminal devices, connections and elevations. Include all related specialty rooms (i.e. electrical, data/technology). Drawings shall be at a minimum scale of 1/4" per 1'-0" and shall be fully coordinated with the work of other trades and/or Sections.
 - 2. Identify congested areas and clearly indicate solutions to space problems, developed in conjunction with the work of other trades and/or Sections. Identification of space problems without proposed solutions is not acceptable and is grounds for rejection. For such areas indicate, superimposed, the work of all trades and/or Sections involved and:
 - a. Clearly identify each area of congestion and deviations from the Contract Documents, and:
 - b. Proposed solution(s), clearly documented and signed-off by all other trades and/or Sections involved.
 - D. Certificates: Submit final inspection certificates signed by governing authorities.
 - E. Operating and Maintenance Instructions and Manuals.
 - 1. Instructions on major items, including but not limited to: switchgear, generators, pumps, air compressors, water heaters, water softeners, specialty units, fans, air handlers, AC units and temperature controls, shall be by representative of manufacturer of respective equipment.
 - 2. Submit as identified below and as directed in Division 1.
 - a. Names, addresses and phone numbers of contractors and subcontractors. Alphabetical list of all system components, with the name, address, and 24-hour phone number of the company responsible for servicing each item during the first year of operation.
 - b. Complete operating and maintenance instructions and parts lists of all equipment and component parts. Data sheets to show complete internal wiring, and electrical ratings and characteristics, catalog data on component parts whether furnished by equipment manufacturer or others, names, addresses and telephone numbers of source of supply for parts subject to wear or failure, and description of operating, test, adjustment, and maintenance procedures.
 - 1) Where data sheets included in manual cover equipment, options, or other features not part of equipment actually furnished, line out these references or otherwise clearly mark so remaining text, diagrams, drawings, schedules, and similar information shall apply specifically to equipment furnished.
 - c. Operating Instructions should include, but not be limited to:

- 1) Normal starting, operational and shutdown procedures, including emergency procedures for each type of equipment/system.
 - 2) Equipment wiring diagrams.
 - 3) All other items as may be specified/required by this Section and the Contract Documents.
- d. Maintenance Instructions
- 1) All items as may be specified/required by this Section and the Contract Documents.
- e. Manufacturers Data (each piece of equipment)
- 1) Installation instructions
 - 2) Drawings & specifications
 - 3) Parts List, including recommended stock and long lead parts/components.
 - 4) Wiring and riser diagrams.
 - 5) Warranties and guarantees for all equipment, materials and components, including repair, replacement and labor from both Contractor and manufacturer as required by the Contract Documents.
 - 6) Certificates of Installation – manufacturer’s certification of supervision during equipment installation and start-up procedures.
 - 7) Instruction certificates – certificates of compliance with Sections specific training and instruction programs.
 - 8) All other items as may be specified/required by this Section and the Contract Documents.

F. Record Documents.

1. Maintain one (1) complete set of blueline prints and specifications at the job site exclusively for recording deviations from the drawings which are necessary because of job conditions, request for information and/or approved change orders. Record locations and depths of buried and concealed conduits or other systems components from fixed, easily identifiable objects, such as building walls or other fixed physical objects. Where conduits are concealed in walls or other fixed physical objects, indicate distances from building corners or other building features not likely to be disturbed by fixture alterations. Drawings, specifications (as-builts) and approved submittals.
2. Where the project use a BIM model the contractor shall keep the model updated in a similar fashion, maintaining the current project record as described in (a), above and submit, an addition to all other requirements of this Section and other provisions of the Contract Documents a complete and accurate BIM model for the project.
3. Prior to Substantial Completion, obtain from the Architect a complete set of electronic CADD drawings. Record all revisions to these drawings to indicate as-built conditions. Indicate all changes, including RFI’s, on this set of documents. Submit one set of blueprints of these revised drawings for review. Make necessary changes and deliver to Architect one set of reproducibles and one electronic copy, including and BIM model, upon Final Completion and Acceptance. Refer to Division 1 for additional requirements.
4. Provide full size copies of record one-line diagrams, in metal frames with glass front. Obtain Record prints from Owner’s Representative at Contractor’s cost and have prints framed by a firm normally engaged in this work. Locate diagrams as directed.
5. All test reports, certifications, and inspection reports.
6. AHJ/Specialty AHJ Approvals (i.e. Fire Marshal and/or Fire Department system approvals).
7. Substantial and Final inspection certificate signed by governing authorities.
8. All other items as may be specified/required by this Section and/or other provisions of the Contract Documents.

1.4 EQUIPMENT DEVIATIONS & SUBSTITUTIONS

- G. See Division 1 for requirements and procedures related to Deviations and Substitutions. Unless specified elsewhere in the Contract Documents, a minimum of two (2) weeks shall be allowed for evaluation. The burden of all systems re-engineering/design, testing, suitability and constructability is solely placed upon the Contractor for all deviations from the basis of design as reflected in the Contract Documents.
- H. Where the contractor proposes to use an item of equipment other than that specified or detailed on the drawings which requires any redesign of any portion of the project, including but not limited to the mechanical, electrical, plumbing, structure, or architectural design or any of their respective subcomponents. Contractor shall be responsible to the Architect/Engineer and/or Owner for all costs, expenses and impact to the project budget and/or schedule resulting from any required investigation, analysis or redesign, including but not limited to; payment for required overtime, out-of-house resources/consultants or other higher cost resources of the Architect/Engineer, Owner or AHJ as may be required to perform the investigation, analysis or redesign (cumulatively and hereinafter, "Deviation Review Costs")

1.5 COORDINATION

- A. Drawings and corresponding electronic media are diagrammatic and indicate the general arrangement of systems and work included in the Work. Consult the drawings, details and other electronic media for locations of fixtures and equipment; where same are not definitely located, obtain this information from the Architect/Engineer.
- B. The drawings and related electronic media have been made to scale with the best knowledge of conditions, dimensions and space requirements available at the time of design and shall be followed as closely as possible during performance of the Work and coordination with the work of others. The forgoing however shall not relieve Contractor from its responsibility to verify all conditions. Dimensions and space requirements prior to commencement of the Work and to immediately report any errors or discrepancies to the Architect/Engineer..
- C. Prior to construction, coordinate the Work with that of other trades and building components.
- D. Before starting work, carefully examine the site and all Contract Documents. Become thoroughly familiar with new and existing conditions governing work on this project. Verify indicated elevations, building measurements, rough-in dimensions and equipment locations before proceeding with any of the work.
- E. Sequence, coordinate, and integrate installations of systems materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning prior to building enclosure.

1.6 ACCESSIBILITY

- A. Contractor is responsible for verifying that equipment and devices will fit within the space shown on the drawings. Contractor shall locate all equipment which must be serviced, operated or maintained, if fully accessible positions.
- B. Minor deviations from the drawings may be made to allow for better accessibility, but changes of magnitude or which involve extra cost shall not be made without approval from the Architect/Engineer.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum 5 years documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with a minimum of 5 years documented experience. Company personnel shall be approved by manufacturer for all product installations and required training.
- C. Conform to all applicable standards, codes and regulation and industry best practice requirements.
- D. All materials and equipment shall be new, shall bear manufacturer's name, and shall conform to the grade, quality and standards specified herein. Type, capacity and application shall be suitable and capable of satisfactory operation for the purpose intended. All equipment and components shall include UL label and/or marking on equipment body/device including manufacturer's name, pressure rating(s), electrical classification(s), limits and ratings as applicable to individual components for the purpose specified and intended.
- E. Cutting & Patching: Unless otherwise required by the Contract Documents, Contractor shall be responsible for all cutting, fitting and patching required to complete the Work, or to make portions of the Work and existing conditions fit together properly, and all such areas shall be restored to the conditions existing prior to the cutting, fitting and patching unless otherwise provided in the Contract Documents.
- F. Contractor shall promptly correct any portion of the Work that is defective or not in accordance with the Contract Documents or rejected by the Architect/Engineer or Owner. Contractor shall be responsible for, and pay for all costs arising out of, any additional testing and inspections, demolition, uncovering and replacement and additional design and consulting services required to properly correct any portion of the Work.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. All materials and equipment shall be adequately covered and protected against dirt, water, chemical or mechanical damage, and theft. At completion, all work, equipment and materials shall be cleaned, and damage repaired by Contractor. Damaged equipment will be replaced by the contractor if Owner does not accept repairs done to the equipment. Such replacement shall be scheduled to minimize building system interruption of occupied or scheduled for occupancy.
- B. Material delivered at the site shall not be left exposed to the weather or left unattended. Deliver pipes, tubes and conduit with factory-applied end-caps. Contractor shall be responsible to maintain end-caps or provide temporary end caps on all open-ended piping, tubes and conduit

through shipping, storage, and handling to prevent pipe-end damage and prevent entrance of dirt, debris, and moisture.

- C. Protect stored material from moisture and dirt. Protect plastic pipes and materials from sunlight and support to prevent sagging and bending.
- D. Contractor shall check the openings in the building and the size of the doors, passages, and openings through which equipment is to be admitted. Wherever necessary, he shall provide the equipment in sections or knocked down in order to admit the equipment through these openings.

1.9 PERMITS, FEES & UTILITIES

- A. Obtain and pay for all necessary permits, fees and utilities and inspections required to perform the Work.
- B. Coordinate work with local regulatory entities, utility companies and others as required to fully comply with the requirements of this section and the Contract Documents, including those for both temporary and permanent services.
- C. Permits, fees and utility expenses to be paid by Owner, if any, shall only where specifically required by the Contract Documents, and then only to the extent so specified.

1.10 DOCUMENT OWNERSHIP

- A. The Drawings and Specifications, combined with the calculations, field data, notes, and reports, are the intellectual and real property of the Architect and/or Engineer. This covers all forms of written and recorded or electronic media. The reuse of these documents without specific permission of the Engineer is prohibited. The Drawings may be employed by the Owner and Contractor for the express use of constructing, commissioning and operating the facility only upon proper execution of the Agreement for Use of Electronic Files & Data.

1.11 GUARANTEE AND WARRANTY

- A. Contractor shall warrant and guarantee all work against faulty material or workmanship for a period of one (1) year from the date of final completion and written acceptance by the Owner, unless specified more stringently elsewhere in the Contract Documents.
- B. If a defect or deficiency in the Work is discovered within the one (1) year Warranty & Guarantee period or within such longer period as may be prescribed by the Laws or by any specific guarantee, and Owner elects to have Contractor correct such defect or deficiency, Owner shall notify Contractor of such defect or deficiency in writing.
- C. See Division 1 – Closeout Submittals for additional warranty requirements.
- D. Specific exclusions, if any, from this one (1) year warrantee and guarantee period are listed in the individual specification sections.

1.12 LIMITATIONS OF LIABILITY

- A. Architect/Engineer is not responsible for Contractor's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, and is not responsible for Contractor's failure to perform or furnish the work in accordance with the Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.
 - 2. Manufacturer: Unless otherwise specified, company specializing in manufacturing specified products for at least 3 years.

2.2 MATERIALS AND EQUIPMENT

- A. The device numbers noted in this specification are generally those of a specific manufacturer and represent the minimum quality required as the basis of design for this project. Subject to the Substitutions and other provisions of the Contract Documents, Contractor may submit equivalent devices from the other manufacturers listed in the section.
- B. Materials and equipment used in carrying out these specifications shall be new and have UL listing, or listing by other recognized testing laboratory when such listings are available.
- C. All material shall bear manufacturer's name, model number, electrical characteristics and other identification and shall be the standard product of manufacturer regularly engaged in production of similar material.

PART 3 EXECUTION

3.1 UTILITY SERVICE(S)

- A. Contractor shall be responsible for verifying and coordinating the work with local utility companies providing service to the facility and/or site and coordination with the work of others. This shall include, but not be limited to:
 - 1. Confirmation of schedule and service routing and sequence of the work to be performed by each utility, contractor, subcontractor or others to ensure that the work can be performed without impact to the project schedule and with minimum interruption to services.
 - 2. Verification of utility services point of entry to the facility, including applicable invert elevations, proper placement of sleeves and/or penetrations and sealant thereof.
 - 3. Establishing utility point of contact, documenting the local utility company representatives:
 - a. Company: Lane Electric Cooperative

3.2 ELECTRICAL SYSTEMS

- A. Visit site and observe conditions under which work must be performed.
- B. Before starting work, carefully examine Architectural, Plumbing, Heating, Ventilating and Air Conditioning drawings to become thoroughly familiar with conditions governing work on this project. Verify elevations, measurements, rough-in requirements of equipment and its installation location before proceeding with the work. Install equipment with access as required by the NEC.

- C. The Drawings are diagrammatic. They do not show every offset, bend, conduit body, elbow or junction box that may be required to install work in the space provided and avoid conflicts. Follow the Drawings as closely as is practical and install additional bends, offsets and elbows where needed by local job site conditions. Provide necessary junction boxes to meet code regulations for the allowed number of conduit bends.
- D. Provide supports, blocking, hangers, and auxiliary structural members required for support of work.
- E. Furnish and set all sleeves for passage of raceways through structural, masonry, and concrete walls, floors, and elsewhere for proper protection of the raceways.
- F. The architectural drawings govern the locations and elevations of all electrical equipment, devices and fixtures. Resolve conflicts with the Architect prior to rough-in.
- G. Verify that the physical dimension of each item of electrical equipment will fit the available space. Coordinate electrical equipment space requirements with the allotted space provisions, and access routes through the construction area.
- H. Coordinate all aspects of the electrical, telephone and other utility services with the appropriate serving utility company.
- I. Call to the attention of the Architect any error, conflict or discrepancy in Plans and/or Specifications. Do not proceed with any questionable items of work until clarification of same has been made. Supplementary Details and Plans may be supplied as required and they will become a part of the Contract Documents.

3.3 EQUIPMENT INSTALLATION

- A. Follow manufacturer's instructions.
- B. Where the product has no manufacturer's instructions, follow these specifications. Where neither the manufacturer nor these specifications contain such instructions, install in accordance with the standards listed above. No allowance of any kind will be made for negligence on part of Contractor to foresee means of bringing in or installing equipment into position.
 - 1. Verify all dimensions by field measurements.
 - 2. Install systems, materials, and equipment to provide the maximum headroom possible.
 - 3. Install systems, materials, and equipment to comply with approved submittal data, including coordination drawings
 - 4. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.
 - 5. Fit surface panels, devices and outlets with neat, appropriate trims, plates or covers, without over-hanging edges, protruding corners or raw edges, to leave a finished appearance.
 - 6. Extend maintenance and access components (i.e., grease fittings, service panels, and similar items) to accessible locations.
 - 7. Install equipment to allow right of way for piping installed at required slope.
- C. Locations:
 - 1. Verify all locations with actual field conditions, architectural, structural, electrical, plumbing, heating and ventilating plans to avert possible installation conflicts.
 - 2. Architect reserves the right to make minor changes prior to installation without cost to Owner.

3. Coordinate work with that of other trades to assure symmetrical placing of fixtures, sprinkler heads and other exposed components with respect to ceiling tile, grilles, etc. See Architectural reflected ceiling plan for exact location of light fixtures and other equipment.
4. Any work which is incorrectly installed without prior verification without required coordination will be ordered removed and relocated and any changes or damage resulting to other work shall be repaired and/or replaced at no cost to the Owner.
5. In general, locate all finished devices or other exposed finished devices as indicated on or by symbols on drawings. Where devices or other exposed finished components occur in face, decks or base millwork, walls, ceilings or other finished surfaces carefully coordinate with details and arrangements of same.
6. All mounting heights shown on drawings are from finish floor to centerline unless otherwise indicated or required by code. Mounting heights at non-typical locations shown with (+) sign and height required noted adjacent to such device. Devices located in concrete block, brick or tile walls are to be adjusted in height to coordinate with modular joints of the materials. Verify requirements with Architect prior to installation.
7. Wiring Requirements: Install wiring complete to every outlet with all devices shown and/or required. All wiring to be in raceways and concealed throughout finished areas unless specifically noted otherwise. For the purpose of electrical specifications, all areas, with the exception of boiler rooms, mechanical rooms and mechanical spaces, are to be considered as finished areas.

3.4 NOISE CONTROL

- A. Back to back or straight through boxes are not permitted unless specifically noted on the drawings.
- B. Route raceways along corridors or other noncritical noise space to minimize penetrations through sound rated walls. Seal raceway penetrations through sound rated walls.

3.5 FIRE WALL PENETRATIONS

- A. Perform necessary fire rated wall sealing for the work in accordance with Division 7 - Fire and Smoke Protection.
- B. Provide necessary wall material to maintain fire wall rating where flush mounted equipment or components installed.

3.6 EQUIPMENT SUPPORT

- A. General
 1. Provide a system of supporting devices and hangers for support and bracing of piping, conduit and equipment as required by code or as provided under this Division as indicated on plans and as described herein.
 2. Do not install supporting devices so as to obstruct access to equipment.
 3. Floor-mounted equipment shall not be held in place solely by its own dead weight. Include floor anchor fastening in all cases.
 4. Do not support ductwork, piping, conduits, conductors, or equipment from other piping, conduits, ceiling grids, equipment, ductwork, or ceiling supports. In all cases, provide independent supports for such components and equipment.

3.7 PAINTING

- A. Contractor shall be responsible for and shall coordinate the timing of painting with the work of other trades and to minimize the requirements for damage and touchup to the work.
- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.8 CLEANING

- A. General
 - 1. At all times keep the premises free from accumulation of waste materials or rubbish caused by the employees or the work. At the completion of the work, remove all superfluous materials, equipment and debris related to or resulting from the work.
 - 2. All systems, equipment and component including but not limited to all panels, compartments, points of access, surface areas, panels, whether concealed or not shall be free from debris, filings, clippings, dirt, dust and debris and in a new condition. Touch up paint where necessary.
 - 3. Where existing systems are expanded and/or remodeled, clean the new installation prior to making final connection to the existing systems.

3.9 COOPERATION WITH OTHER TRADES

- A. Contractor shall cooperate with and coordinate the work with that of all other trades in the performance of the work. Contractor shall be responsible for any and all removal, replacement or repairs to its work or the work of others for its failure to fully comply with this provision.

3.10 OPERATION AND INSTRUCTION

- A. Upon completion of the work and prior to final acceptance, Contractor shall operate the equipment for a period as required to fully instruct the Owner and its authorized representatives in all details of operation, adjustment and maintenance.

END OF SECTION

SECTION 26 0519
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

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. Copper building wire rated 600 V or less.
 - 2. Mineral-insulated cable, Type MI, rated 600 V or less.
 - 3. Connectors, splices, and terminations rated 600 V and less.
- B. Related Requirements:
 - 1. Section 27 1000 "Structured Cabling System" for twisted pair cabling used for data circuits.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: Indicate type, use, location, and termination locations.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Member company of NETA.
 - 1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

- A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.
- B. Manufacturers:
 - 1. Belden Inc
 - 2. General Cable Tech
 - 3. Southwire Company
 - 4. Or approved equal
- C. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
 2. RoHS compliant.
 3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- D. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors, minimum 98% Conductivity.
- E. Conductor Insulation:
1. Type THHN/THWN-2: Comply with UL 83.
 2. Type XHHW-2: Comply with UL 44.
- F. Shield:
1. Type TC-ER: Cable designed for use with VFCs, with oversized crosslinked polyethylene insulation, spiral-wrapped foil plus 85 percent coverage braided shields and insulated full-size ground wire, and sunlight- and oil-resistant outer PVC jacket.

2.2 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. Manufacturers:
1. AFC Cable
 2. Hubbell Power Systems
 3. O-Z/Gedney
 4. Thomas & Betts Corp
 5. Or approved equal.
- C. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.
- D. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.
1. Material: Copper.
 2. Type: One hole with standard barrels.
 3. Termination: Compression.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Feeders: Copper for feeders smaller than No. 4 AWG; copper or aluminum for feeders No. 4 AWG and larger. Conductors shall be solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- C. Branch Circuits: Copper. Stranded for No. 12 AWG and larger
- D. Branch Circuits: Copper. Solid or stranded for No. 14 AWG and smaller

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Exposed Feeders: Not allowed.
- B. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN/THWN-2, single conductors in raceway.
- C. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material.
 - 1. Use oxide inhibitor in each splice, termination, and tap for aluminum conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150 mm) of slack.

3.5 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.7 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 078413 "Penetration Firestopping."

3.8 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
 - 1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors.
 - 2. Perform each of the following visual and electrical tests:
 - a. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.
 - b. Test bolted connections for high resistance using one of the following:
 - 1) A low-resistance ohmmeter.
 - 2) Calibrated torque wrench.
 - 3) Thermographic survey.
 - c. Inspect compression-applied connectors for correct cable match and indentation.
 - d. Inspect for correct identification.
 - e. Inspect cable jacket and condition.
 - f. Insulation-resistance test on each conductor for ground and adjacent conductors. Apply a potential of 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable for a one-minute duration.
 - g. Continuity test on each conductor and cable.
 - h. Uniform resistance of parallel conductors.
- B. Cables will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports to record the following:
 - 1. Procedures used.
 - 2. Results that comply with requirements.
 - 3. Results that do not comply with requirements, and corrective action taken to achieve compliance with requirements.

END OF SECTION

SECTION 26 0526

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

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 grounding and bonding systems and equipment.

1.3 ACTION SUBMITTALS

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

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.
- C. Provide ground bar at network equipment location with #6 bare copper conductor run to existing service panel ground bus.

2.2 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.
 - 3. Tinned Conductors: ASTM B 33.
 - 4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
 - 5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 - 6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.
- C. Grounding Bus: At network equipment rack provide predrilled rectangular bar of annealed copper, 1/4 by 4 inches (6.3 by 100 mm) in cross section, with 9/32-inch (7.14-mm) holes

spaced 1-1/8 inches (28 mm) apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V and shall be Lexan or PVC, impulse tested at 5000 V.

2.3 CONNECTORS

- A. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.
- B. Bus-Bar Connectors: Compression type, copper or copper alloy, with two wire terminals.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8AWG and smaller, and stranded conductors for No. 6AWG and larger unless otherwise indicated..
- B. Grounding Bus: Install in network equipment room.
 - 1. Install bus horizontally, on insulated spacers 2 inches from wall, 6 inches above floor.

3.2 GROUNDING AT THE SERVICE

- A. Equipment grounding conductors and grounding electrode conductors are existing. Make connections as required by Code to new meter base and 150/3 enclosed circuit breaker.

3.3 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 - 1. Lighting circuits.
 - 2. Receptacle circuits.
 - 3. Single-phase motor and appliance branch circuits.
 - 4. Flexible raceway runs.
 - 5. Armored and metal-clad cable runs.

3.4 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

END OF SECTION

SECTION 26 0529

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Steel slotted support systems.
 - 2. Aluminum slotted support systems.
 - 3. Nonmetallic slotted support systems.
 - 4. Conduit and cable support devices.
 - 5. Support for conductors in vertical conduit.
 - 6. Structural steel for fabricated supports and restraints.
 - 7. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.
 - 8. Fabricated metal equipment support assemblies.

PART 2 - PRODUCT

2.1 CHANNEL

- A. Aluminum Slotted Support Systems: Extruded-aluminum channels and angles with minimum 13/32-inch- (10-mm-) diameter holes at a maximum of 8 inches (200 mm) o.c. in at least one surface.
 - 1. Manufacturers:
 - a. Cooper Industries
 - b. Haydon Corp.
 - c. Thomas & Betts
 - d. Or approved equal
 - 2. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
 - 3. Channel Material: 6063-T5 aluminum alloy.
 - 4. Fittings and Accessories Material: 5052-H32 aluminum alloy.
 - 5. Channel Width: Selected for applicable load criteria.
- B. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.
- B. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."
- C. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and RMC as scheduled in NECA 1, where its Table 1 lists maximum spacings that are less than those stated in NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.
- D. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits. Secure raceways and cables to these supports with two-bolt conduit clamps.
- E. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings, and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT may be supported by openings through structure members, according to NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

3.3 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
- B. Touchup: Comply with requirements in Section 099123 "Interior Painting" for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 26 0529

SECTION 26 0533

RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

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. Metal conduits and fittings.
 - 2. Nonmetallic conduits and fittings.
 - 3. Metal wireways and auxiliary gutters.
 - 4. Nonmetal wireways and auxiliary gutters.
 - 5. Surface raceways.
 - 6. Boxes, enclosures, and cabinets.
- B. Related Requirements:
 - 1. Section 270528 "Pathways for Communications Systems" for conduits, wireways, surface pathways, innerduct, boxes, faceplate adapters, enclosures, cabinets, and handholes serving communications systems.

1.3 DEFINITIONS

- A. GRC: Galvanized rigid steel conduit.
- B. IMC: Intermediate metal conduit.
- C. EMT: Electric metallic Tubing
- D. FMC: Flexible Metal Conduit
- E. LFMC: Liquidtight flexible metal conduit.
- F. MC: Metal Clad Cable

1.4 ACTION SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of items involved:
 - 1. Structural members in paths of conduit groups with common supports.
 - 2. HVAC and plumbing items and architectural features in paths of conduit groups with common supports.
- B. Seismic Qualification Data: Certificates, for enclosures, cabinets, and conduit racks and their mounting provisions, including those for internal components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
 - 4. Detailed description of conduit support devices and interconnections on which the certification is based and their installation requirements.

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

- A. Metal Conduit:
 - 1. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - 2. GRC: Comply with ANSI C80.1 and UL 6.
 - 3. ARC: Comply with ANSI C80.5 and UL 6A.
 - 4. IMC: Comply with ANSI C80.6 and UL 1242.
 - 5. EMT: Comply with ANSI C80.3 and UL 797.
 - 6. FMC: Comply with UL 1; zinc-coated steel.
 - 7. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
- B. Metal Fittings:
 - 1. Comply with NEMA FB 1 and UL 514B.
 - 2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - 3. Fittings, General: Listed and labeled for type of conduit, location, and use.
 - 4. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 1203 and NFPA 70.
 - 5. Fittings for EMT:
 - a. Material: Steel.
 - b. Type: compression.

2.2 METAL WIREWAYS AND AUXILIARY GUTTERS

- A. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1 unless otherwise indicated, and sized according to NFPA 70.

- B. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- C. Wireway Covers: Screw-cover type unless otherwise indicated.
- D. Finish: Manufacturer's standard enamel finish.

2.3 BOXES, ENCLOSURES, AND CABINETS

- A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- B. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, **[ferrous alloy]** **[aluminum]**, Type FD, with gasketed cover.
- D. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb
- E. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- F. Gangable boxes are allowed.
- G. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 with continuous-hinge cover with flush latch unless otherwise indicated.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 - 2. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Indoors: Apply raceway products as specified below unless otherwise indicated:
 - 1. Exposed, Not Subject to Physical Damage: EMT.
 - 2. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 - 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 - 4. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250.
- B. Minimum Raceway Size: ½ -inch trade size.
- C. Raceway Fittings: Compatible with raceways and suitable for use and location.
 - 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 - 2. EMT: Use compression, steel fittings. Comply with NEMA FB 2.10.

3. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

3.2 INSTALLATION

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
- B. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- C. Do not fasten conduits onto the bottom side of a metal deck roof.
- D. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- E. Complete raceway installation before starting conductor installation.
- F. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- G. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.
- H. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.
- I. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- J. Support conduit within 12 inches of enclosures to which attached.
- K. Stub-Ups to Above Recessed Ceilings:
 1. Use EMT, IMC, or RMC for raceways.
 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- L. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- M. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.
- N. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.

- O. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- P. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- Q. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- R. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- S. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.
- T. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 2. Where an underground service raceway enters a building or structure.
 3. Conduit extending from interior to exterior of building.
 4. Conduit extending into pressurized duct and equipment.
 5. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
 6. Where otherwise required by NFPA 70.
- U. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 36 inches of flexible conduit for recessed and semirecessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 1. Use LFMC in damp or wet locations subject to physical damage.
 2. Use LFMC or LFNC in damp or wet locations not subject to physical damage.
- V. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
- W. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel..
- X. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

3.3 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.4 FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.5 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

END OF SECTION 260533

SECTION 26 0544

SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

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. Sleeves for raceway and cable penetration of non-fire-rated construction walls and floors.
 - 2. Sleeve-seal systems.
 - 3. Sleeve-seal fittings.
 - 4. Silicone sealants.
- B. Related Requirements:
 - 1. Section 078413 "Penetration Firestopping" for penetration firestopping installed in fire-resistance-rated walls, horizontal assemblies, and smoke barriers, with and without penetrating items.

PART 2 - PRODUCTS

2.1 SLEEVES

- A. Wall Sleeves:
 - 1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.
 - 2. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.
- B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.
- C. Sleeves for Rectangular Openings:
 - 1. Material: Galvanized sheet steel.
 - 2. Minimum Metal Thickness:
 - a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and with no side larger than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
 - b. For sleeve cross-section rectangle perimeter 50 inches (1270 mm) or more and one or more sides larger than 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2.2 SLEEVE-SEAL SYSTEMS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

1. Manufacturers:
 - a. CALPICO, Inc
 - b. Metraflex Co.
 - c. Proco Products
 - d. Or approved equal
2. Sealing Elements: EPDM rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
3. Pressure Plates: Carbon steel.
4. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, of length required to secure pressure plates to sealing elements.

2.3 SLEEVE-SEAL FITTINGS

- A. Description: Manufactured plastic, sleeve-type, waterstop assembly made for embedding in concrete slab or wall. Unit shall have plastic or rubber waterstop collar with center opening to match piping OD.
 1. Manufacturers:
 - a. HOLDRITE
 - b. Or approved equal

2.4 SILICONE SEALANTS

- A. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below.
 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces that are not fire rated.
- B. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

- A. Comply with NECA 1.
- B. Comply with NEMA VE 2 for cable tray and cable penetrations.
- C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:
 1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
 - a. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Section 079200 "Joint Sealants."
 - b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.
 2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
 3. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable unless sleeve seal is to be installed.
 4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.

5. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level. Install sleeves during erection of floors.
- D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:
1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
 2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.
- E. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- F. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at raceway entries into building.
- B. Install type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

END OF SECTION 26 0544

SECTION 26 0553

IDENTIFICATION FOR ELECTRICAL SYSTEMS

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. Color and legend requirements for raceways, conductors, and warning labels and signs.
 - 2. Labels.
 - 3. Bands and tubes.
 - 4. Tapes and stencils.
 - 5. Tags.
 - 6. Signs.
 - 7. Cable ties.
 - 8. Paint for identification.
 - 9. Fasteners for labels and signs.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for electrical identification products.
- B. Samples: For each type of label and sign to illustrate composition, size, colors, lettering style, mounting provisions, and graphic features of identification products.
- C. Identification Schedule: For each piece of electrical equipment and electrical system components to be an index of nomenclature for electrical equipment and system components used in identification signs and labels. Use same designations indicated on Drawings.
- D. Delegated-Design Submittal: For arc-flash hazard study.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with NFPA 70.
- B. Comply with NFPA 70E requirements for arc-flash warning labels.
- C. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

2.2 COLOR AND LEGEND REQUIREMENTS

- A. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded service feeder conductors.
 - 1. Color shall be factory applied or field applied for sizes larger than No. 8 AWG if authorities having jurisdiction permit.
 - 2. Colors for 240/120-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - 3. Color for Neutral: White
 - 4. Color for Equipment Grounds: Green
 - 5. Colors for Isolated Grounds: Green with white stripe.
- B. Raceways and Cables Carrying Circuits at More Than 600 V:
 - 1. Black letters on an orange field.
 - 2. Legend: "DANGER - CONCEALED HIGH VOLTAGE WIRING."
- C. Warning Label Colors:
 - 1. Identify system voltage with black letters on an orange background.
- D. Warning labels and signs shall include, but are not limited to, the following legends:
 - 1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
 - 2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES (915 MM)."
- E. Equipment Identification Labels:
 - 1. Black letters on a white field.

2.3 LABELS

- A. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.
 - 1. Manufacturers:
 - a. Brady Corp.
 - b. Emedco
 - c. Panduit Corp.

2.4 CABLE TIES

- A. Manufacturers:
 - 1. HellermannTyton
 - 2. Ideal Industries
 - 3. Panduit Corp
 - 4. Or approved Equal
 - 5. Color: Black.

2.5 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

3.2 INSTALLATION

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
- B. Install identifying devices before installing acoustical ceilings and similar concealment.
- C. Verify identity of each item before installing identification products.
- D. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- E. Apply identification devices to surfaces that require finish after completing finish work.
- F. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.
- G. System Identification for Raceways and Cables under 600 V: Identification shall completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.
 - 1. Secure tight to surface of conductor, cable, or raceway.
- H. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
- I. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from the floor.
- J. Accessible Fittings for Raceways: Identify the covers of each junction and pull box of the following systems with the wiring system legend and system voltage.
- K. Vinyl Wraparound Labels:
 - 1. Secure tight to surface of raceway or cable at a location with high visibility and accessibility.
 - 2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.
- L. Cable Ties: General purpose, for attaching tags, except as listed below:
 - 1. Outdoors: UV-stabilized nylon.
 - 2. In Spaces Handling Environmental Air: Plenum rated.

3.3 IDENTIFICATION SCHEDULE

- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
- B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
- C. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits, More Than 30A and 120V to Ground: Identify with self-adhesive raceway labels.
 - 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.
- D. Accessible Fittings for Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive labels containing the wiring system legend and system voltage.
- E. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use vinyl wraparound labels to identify the phase.
 - 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.
- F. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use self-adhesive labels with the conductor or cable designation, origin, and destination.
- G. Control-Circuit Conductor Termination Identification: For identification at terminations, provide self-adhesive labels with the conductor designation.
- H. Arc Flash Warning Labeling: Self-adhesive labels.
- I. Equipment Identification Labels:
 - 1. Indoor Equipment: Laminated acrylic or melamine plastic sign.
 - 2. Equipment to Be Labeled:
 - a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be in the form of a self-adhesive, engraved, laminated acrylic or melamine label.
 - b. Enclosures and electrical cabinets.
 - c. Enclosed switches.
 - d. Enclosed circuit breakers.
 - e. Remote-controlled switches, dimmer modules, and control devices.

END OF SECTION

SECTION 26 0923

LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Standalone daylight-harvesting switching and dimming controls.
 - 2. Indoor occupancy and vacancy sensors.
 - 3. Switchbox-mounted occupancy sensors.
- B. Related Requirements:
 - 1. Section 262726 "Wiring Devices" for wall-box dimmers, non-networkable wall-switch occupancy sensors, and manual light switches.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
 - 1. Show installation details for the following:
 - a. Occupancy sensors.
 - b. Vacancy sensors.
 - 2. Interconnection diagrams showing field-installed wiring.
 - 3. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plan(s) and elevations, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Suspended ceiling components.
 - 2. Structural members to which equipment will be attached.
 - 3. Items penetrating finished ceiling, including the following:
 - a. Luminaires.
 - b. Air outlets and inlets.
 - c. Access panels.
 - d. Control modules.
- B. Field quality-control reports.
- C. Sample Warranty: For manufacturer's warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each type of lighting control device to include in operation and maintenance manuals.

1.6 WARRANTY

- A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace lighting control devices that fail(s) in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to faulty operation of lighting control devices.
 - 2. Warranty Period: Two year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 INDOOR OCCUPANCY AND VACANCY SENSORS

- A. Manufacturers:
 - 1. Wattstopper
 - 2. Leviton
 - 3. Cooper
 - 4. Or approved equal
- B. General Requirements for Sensors:
 - 1. Ceiling-mounted, solid-state indoor occupancy and vacancy sensors.
 - 2. Dual technology.
 - 3. Integrated or Separate power pack.
 - 4. Hardwired connection to switch.
 - 5. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - 6. Operation:
 - a. Combination Sensor: Unless otherwise indicated, sensor shall be programmed to turn lights on when coverage area is occupied and turn them off when unoccupied, or to turn off lights that have been manually turned on; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
 - 7. Sensor Output: Sensor is powered from the power pack.
 - 8. Power: Line voltage.
 - 9. Power Pack: Dry contacts rated for 20-A LED load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc, 150-mA, Class 2 power source, as defined by NFPA 70.
 - 10. Mounting:
 - a. Sensor: Suitable for mounting in any position on a standard outlet box.
 - b. Relay: Externally mounted through a 1/2-inch (13-mm) knockout in a standard electrical enclosure.
 - c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
 - 11. Indicator: Digital display, to show when motion is detected during testing and normal operation of sensor.
 - 12. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc (21.5 to 2152 lux); turn lights off when selected lighting level is present.

2.2 SWITCHBOX-MOUNTED OCCUPANCY SENSORS

- A. Manufacturers:
 - 1. Wattstopper

2. Leviton
 3. Cooper
 4. Or approved equal
- B. General Requirements for Sensors: Automatic-wall-switch occupancy sensor with manual on-off switch, suitable for mounting in a single gang switchbox, using hardwired connection.
1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 2. Occupancy Sensor Operation: Unless otherwise indicated, turn lights on when coverage area is occupied, and turn lights off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
 3. Operating Ambient Conditions: Dry interior conditions, 32 to 120 deg F (0 to 49 deg C).
 4. Switch Rating: Not less than 800-VA LED load at 120 V, 1200-VA LED load at 277 V, and 800-W incandescent.
- C. Wall-Switch Sensor:
1. Standard Range: 180-degree field of view, field adjustable from 180 to 40 degrees; with a minimum coverage area of 900 sq. ft. (84 sq. m).
 2. Sensing Technology: PIR.
 3. Switch Type: SP, field-selectable automatic "on," or manual "on," automatic "off."
 4. Capable of controlling load in three-way application.
 5. Voltage: Match the circuit voltage
 6. Ambient-Light Override: Concealed, field-adjustable, light-level sensor from 10 to 150 fc (108 to 1600 lux). The switch prevents the lights from turning on when the light level is higher than the set point of the sensor.
 7. Concealed, field-adjustable, "off" time-delay selector at up to 30 minutes.
 8. Concealed, "off" time-delay selector at 30 seconds and 5, 10, and 20 minutes.
 9. Adaptive Technology: Self-adjusting circuitry detects and memorizes usage patterns of the space and helps eliminate false "off" switching.
 10. Color: White.
 11. Faceplate: Color matched to switch.

2.3 CONDUCTORS AND CABLES

- A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Classes 2 and 3 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 18 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- C. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 18 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine lighting control devices before installation. Reject lighting control devices that are wet, moisture damaged, or mold damaged.

- B. Examine walls and ceilings for suitable conditions where lighting control devices will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SENSOR INSTALLATION

- A. Comply with NECA 1.
- B. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression systems, and partition assemblies.
- C. Install and aim sensors in locations to achieve not less than 90-percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

3.3 WIRING INSTALLATION

- A. Comply with NECA 1.
- B. Wiring Method: Comply with Section 260519 "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size is 1/2 inch (13 mm).
- C. Size conductors according to lighting control device manufacturer's written instructions unless otherwise indicated.
- D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.4 IDENTIFICATION

- A. Identify components and power and control wiring according to Section 260553 "Identification for Electrical Systems."
 - 1. Identify controlled circuits in lighting contactors.
 - 2. Identify circuits or luminaires controlled by photoelectric and occupancy sensors at each sensor.
- B. Label time switches and contactors with a unique designation.

3.5 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting lighting control devices to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.
 - 1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit Owner's operations.
 - 2. For daylighting controls, adjust set points and deadband controls to suit Owner's operations.
 - 3. Align high-bay occupancy sensors using manufacturer's laser aiming tool.

3.6 DEMONSTRATION

- A. Coordinate demonstration of products specified in this Section with demonstration requirements for low-voltage, programmable lighting control systems specified in Section 260943.16 "Addressable-Luminaire Lighting Controls" and Section 260943.23 "Relay-Based Lighting Controls."
- B. Train Owner's maintenance personnel to adjust, operate, and maintain lighting control devices.

END OF SECTION

SECTION 26 2726

WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 1. Standard-grade receptacles, 125 V, 20 A.
 2. USB receptacles.
 3. GFCI receptacles, 125 V, 20 A.
 4. Toggle switches, 120/277 V, 20 A.
 5. Wall plates.

1.3 DEFINITIONS

- A. AFCI: Arc-fault circuit interrupter.
- B. BAS: Building automation system.
- C. EMI: Electromagnetic interference.
- D. GFCI: Ground-fault circuit interrupter.
- E. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
- F. RFI: Radio-frequency interference.
- G. SPD: Surge protective device.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.
- C. Samples: One for each type of device and wall plate specified, in each color specified.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing-label warnings and instruction manuals that include labeling conditions.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

PART 2 - PRODUCTS

2.1 GENERAL WIRING-DEVICE REQUIREMENTS

- A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. Comply with NFPA 70.
- C. RoHS compliant.
- D. Comply with NEMA WD 1.
- E. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:
 - 1. Connectors shall comply with UL 2459 and shall be made with stranding building wire.
 - 2. Devices shall comply with requirements in this Section.
- F. Device Color:
 - 1. Wiring Devices Connected to Normal Power System: White unless otherwise indicated or required by NFPA 70 or device listing.
- G. Wall Plate Color: White.

2.2 STANDARD-GRADE RECEPTACLES, 125 V, 20 A

- A. Duplex Receptacles, 125 V, 20 A:
 - 1. Manufacturers:
 - a. Eaton
 - b. Leviton
 - c. Hubbell
 - d. Or approved equal.
 - 2. Description: Two pole, three wire, and self-grounding.
 - 3. Configuration: NEMA WD 6, Configuration 5-20R.
 - 4. Standards: Comply with UL 498 and FS W-C-596.
- B. Weather-Resistant Duplex Receptacle, 125 V, 20 A:
 - 1. Manufacturers:
 - a. Eaton
 - b. Leviton
 - c. Hubbell
 - d. Or approved equal.
 - 2. Description: Two pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle. Square face.
 - 3. Configuration: NEMA WD 6, Configuration 5-20R.
 - 4. Standards: Comply with UL 498.

5. Marking: Listed and labeled as complying with NFPA 70, "Receptacles in Damp or Wet Locations" Article.

2.3 GFCI RECEPTACLES, 125 V, 20 A

1. Manufacturers:
 - a. Eaton
 - b. Leviton
 - c. Hubbell
 - d. Or approved equal.
2. Description: Integral GFCI with "Test" and "Reset" buttons and LED indicator light. Two pole, three wire, and self-grounding.
3. Configuration: NEMA WD 6, Configuration 5-20R.
4. Type: Non-feed through.
5. Standards: Comply with UL 498, UL 943 Class A, and FS W-C-596.

2.4 TOGGLE SWITCHES, 120 V, 20 A

A. Single-Pole Switches, 120 V, 20 A:

1. Manufacturers:
 - a. Eaton
 - b. Leviton
 - c. Hubbell
 - d. Or approved equal.
2. Standards: Comply with UL 20 and FS W-S-896.

B. Lighted Single-Pole Switches, 120 V, 20 A:

1. Manufacturers:
 - a. Eaton
 - b. Leviton
 - c. Hubbell
 - d. Or approved equal.
2. Description: Handle illuminated when switch is on.

2.5 WALL PLATES

A. Single Source: Obtain wall plates from same manufacturer of wiring devices.

- #### **B. Single and combination types shall match corresponding wiring devices.**
1. Plate-Securing Screws: Metal with head color to match plate finish.
 2. Material for Finished Spaces: White Thermoplastic
 3. Material for Unfinished Spaces: Galvanized steel.

C. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant, die-cast aluminum with lockable cover.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.

- B. Coordination with Other Trades:
 - 1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes, and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
 - 2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
 - 3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
 - 4. Install wiring devices after all wall preparation, including painting, is complete.

- C. Conductors:
 - 1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
 - 2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
 - 3. The length of free conductors at outlets for devices shall comply with NFPA 70, Article 300, without pigtails.
 - 4. Existing Conductors:
 - a. Cut back and pigtail, or replace all damaged conductors.
 - b. Straighten conductors that remain and remove corrosion and foreign matter.
 - c. Pigtailing existing conductors is permitted, provided the outlet box is large enough.

- D. Device Installation:
 - 1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
 - 2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
 - 3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
 - 4. Connect devices to branch circuits using pigtails that are not less than 6 inches (152 mm) in length.
 - 5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
 - 6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
 - 7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
 - 8. Tighten unused terminal screws on the device.
 - 9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

- E. Receptacle Orientation:
 - 1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the right.

- F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.
- G. Dimmers:
 - 1. Install dimmers within terms of their listing.
 - 2. Verify that dimmers used for fan-speed control are listed for that application.
 - 3. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device, listing conditions in the written instructions.
- H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

3.2 GFCI RECEPTACLES

- A. Install non-feed-through GFCI receptacles where protection of downstream receptacles is not required.

3.3 IDENTIFICATION

- A. Comply with Section 26 0553 "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

- A. Test Instruments: Use instruments that comply with UL 1436.
- B. Test Instrument for Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.
- C. Perform the following tests and inspections:
 - 1. Test Instruments: Use instruments that comply with UL 1436.
 - 2. Test Instrument for Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.
- D. Tests for Receptacles:
 - 1. Line Voltage: Acceptable range is 105 to 132 V.
 - 2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
 - 3. Ground Impedance: Values of up to 2 ohms are acceptable.
 - 4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
 - 5. Using the test plug, verify that the device and its outlet box are securely mounted.
 - 6. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault-current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.
- E. Wiring device will be considered defective if it does not pass tests and inspections.
- F. Prepare test and inspection reports.

END OF SECTION

SECTION 26 5000

GENERAL LIGHTING PROVISIONS

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 general information related to providing and installing all interior and exterior lighting systems throughout the project.

B. RELATED REQUIREMENTS

- 1. Section 26 09 23 "Interior Lighting Controls"

1.3 DEFINITIONS

- A. Fixture: See "Luminaire."
- B. IP: International Protection or Ingress Protection Rating.
- C. LED: Light-emitting diode.
- D. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.4 WARRANTIES

- A. Submit a copy of manufacturers' written guarantees for each manufacturer for transmittal to the Owner, agreeing to repair or replace any and all defects in workmanship and/or materials for a period of two (2) years, or as otherwise specified, from the date of final acceptance of the installation, without cost to the Owner.
- B. Submit the Contractor's written guarantee for a period of one (1) year after the date of final acceptance, all apparatus installed by the Contractor to be free of mechanical and electrical defects in workmanship, and to replace the same if, in the opinion of the Architect, the responsibility lies with the Contractor.
- C. LED luminaires shall have a ten (10) year warranty on driver and light modules.

1.5 REQUIREMENTS OF REGULATORY AGENCIES

- A. All equipment covered in this section shall comply with all applicable standards of IESNA, National Electrical Code and all laws, codes and regulations of Federal, State, County and City authorities having jurisdiction over this work.
- B. All equipment shall be U.L. Listed. Equipment shall be listed for Wet or Damp locations, as stated in the luminaire schedule, or as specified by the luminaire catalog number.
- C. Luminaires shall be located so as not to provide any conflicts with barrier free spaces: Public Law 90-480 and American National Standards Institute A1117.1-1961

1.6 MATERIALS AND WORKMANSHIP

- A. All materials and apparatus required for the work, except as specified otherwise, shall be new, of first class quality, and shall be furnished, delivered, erected, connected and finished in every detail, and shall be so selected and arranged as to fit properly into the spaces. Where no specific kind or quality of material is given, an article acceptable to the Architect shall be furnished.
- B. All component parts of each item of equipment or device shall bear the Manufacturer's Nameplate, giving at least the name of the manufacturer, description, size, type, serial number, and electrical characteristics in order to facilitate maintenance or replacement. This nameplate shall not be visible during normal operation of the equipment.
- C. New luminaires that are Blemished, damaged, or unsatisfactory shall be replaced at the direction of the Architect in a satisfactory manner at no cost to the Owner. This includes manufacturer defects as well as damage or blemishes to luminaires during handling and installation. Special attention should be paid to the blades and baffles of luminaires.
- D. Relocate and relamp existing light fixtures as indicated on drawings. Where TLED lamps replace existing T8 lamps replace ballast with Type C 0-10VDC dimming driver

PART 2 PRODUCTS

2.1 GENERAL MATERIALS REQUIREMENTS

- A. Provide accessories as required for compatibility with installation requirements. Luminaire catalog numbers do not necessarily denote specific mounting accessories for where/how luminaire is to be installed.
- B. All materials used in fabrication and mounting luminaires shall be of a non-corrosive nature.
- C. Luminaires shall be free of light leaks. Luminaires shall be designed to provide adequate ventilation for both light sources and drivers or transformers.
- D. Luminaires shall be designed to hide mounting hardware from view when luminaire is completely installed. Exposed fasteners shall not be acceptable, except as noted on details.
- E. Wiring channels and lamp holder mountings shall be rigid and accurately manufactured.
- F. All luminaires when installed shall be set true and free of warps, dents, or other irregularities. The finish of exposed parts or trims shall be as specified or as directed by the Architect/Engineer.
- G. TLED system shall be style C with fixture mounted driver that will accommodate 0-10 Volt DC dimming through daylight sensing system and / or wall mounted dimming switches. TLED lamp systems shall be dimmable to 10% light level without flicker.

2.2 PRODUCT DELIVERY AND STORAGE

- A. Store all luminaires, light sources, drivers and hardware flat, in a clean, dry area off the ground under watertight cover.

PART 3 EXECUTION

3.1 PREPARATION

- A. Report all defects. Contractor shall be held responsible for any existing defects that adversely affect the luminaire or its performance.
- B. Upon Architect's request, Contractor shall provide one sample of selected luminaires.

3.2 INSTALLATION

- A. The installation shall be in accordance with all governing local ordinances and regulations, the Drawings, these special provisions and those sections of the Standard Specifications which apply. All workmanship shall be first class and finished work shall present a neat, uncluttered appearance. The Contractor shall coordinate his work with other construction phases so as to provide a minimum of interference to the combined operations. Contractor shall also coordinate their work with the work on adjacent projects where required.
- B. Clean the housing, trim, reflector surfaces, lens of all luminaires after construction is complete, so as to render them free of any material.
- C. Any luminaire or lamp or lighting device damaged during construction shall be replaced without cost to the Owner.
- D. Replace all inoperative light sources, ballasts, drivers and transformers just prior to acceptance of Project by Owner. Verify that all light sources are installed are exactly as specified for each luminaire type.
- E. Notify Owner and/or Architect about field conditions at variance with contract documents before commencing installation.
- F. It is the contractor's responsibility to review and coordinate with the Architectural drawings for placement of luminaires and lighting control devices.

3.4 TESTS

- A. Prior to final acceptance, the Contractor shall demonstrate by test to the Architect's and/or Lighting Consultant 's satisfaction that all the electrical and lighting equipment installations are in proper condition per drawings and specifications. The Contractor shall furnish all equipment and appliances to make the test.
- B. The Contractor shall be fully responsible for the system during this period of operation and he shall make any adjustment or repairs which may be required, and remedy any defects or damages which may occur, at Contractor's expense.

END OF SECTION

SECTION 27 1000

TELEPHONE / DATA STRUCTURED WIRING SYSTEM

PART 1 - GENERAL

1.01 GENERAL

- A. Under Alternate Bid Furnish and install all labor and materials required for the installation of a complete in-building voice and data cable infrastructure.
- B. Electronics (routers, hubs, telephone equipment) are not included in Work.

1.02 QUALITY ASSURANCE

- A. Do all work in accordance with the guidelines published in EIA/TIA Standard 568 and 569. Where conflicts exist, the plans and specifications shall take precedence. All manufacturer's installation instructions shall be followed.
- B. All workers involved in the installation and termination of cable shall have at least one year of experience. No less than 33% of the workmen on the job shall have attended a vendor sponsored training program covering installation and termination of cable.

1.03 SUBMITTALS

- A. Contract drawings and product data in accordance with Section 260000. Submittals will include the following:
 - 1. All products listed in Part 2
 - 2. Shop drawings showing backboard layout and network rack configuration for main distribution frame.
 - 3. Shop drawings of the different outlet configurations

1.04 GUARANTEE

- A. Guarantee all work against faulty and improper material and workmanship for a minimum period of one (1) year from the date of final written acceptance by Owner, except where guarantee or warranties for longer terms are specified herein.
- B. Upon notification of a problem, the warranty provider shall furnish within 48 hours and at no cost to the Owner, such labor and materials as are needed to restore the system to proper operation.

1.05 RECORD DOCUMENTATION

- A. Record documentation will include all test results and information on cable placement and jack locations. Test results must be neatly and logically packaged and must include jack and/or cable designators.

1.06 SCOPE OF WORK

- A. Network Service Provisions:
 - 1. Extend existing Spectrum Communication service to new network equipment room. Existing Spectrum service consists of an overhead coaxial cable drop to the northeast corner of the building. Coordinate with Spectrum Communications for extension of this service from the existing service demarcation box on the outside of the building, through the attic space to a new network equipment backboard located in the southwest storage room.
 - 2. Coordinate with the City of Lowell to determine provisions needed for extension of future fiber optic service to the main distribution frame. For bid purposes assume that these provisions will consist of a 2" conduit run through the attic from the main distribution

frame to the existing Spectrum Communication service box at the northeast corner of the building.

B Horizontal Cabling:

1. Provide horizontal cable system between each outlet and a communications Distribution Frame.
2. The cable distance between the station jack and the associated communication Distribution Frame shall not exceed 90 meters. Where a cable distance from a station jack to an existing Distribution Frame exceeds 90 meters, the contractor shall notify the Engineer and the Owner and cease work on that jack until further direction is received.
3. Run horizontal cabling concealed in walls and above suspended ceilings.
4. The horizontal cabling system includes Category 6 Twisted Pair -- minimum of 4-pair cable sheaths.

PART 2 - PRODUCTS

2.01 CABLE

A. Category 6 Twisted Pair Cable:

1. All Category 6 twisted pair wiring shall be solid conductor 24AWG 4-pair unshielded twisted pair and must meet all performance specifications of EIA/TIA 568.

2.02 PATCH PANELS

A. Category 6 Patch Panels:

1. All category 6 cables shall be terminated in category 6 compliant high-density patch panels wired to the EIA/TIA 568B standard. Vendors are required to use proper rear wire management systems to secure and support the category 6 cabling.

2.03 TERMINATING EQUIPMENT

A. Category 6 Terminating Equipment:

1. At all station jack locations, the category 6 cabling shall be terminated in category 6 compliant jacks wired to the EIA/TIA 568B standard. Jacks and outlets are to be provided in the bid and are to be ivory in color.

PART 3 - EXECUTION

3.01 CABLE INSTALLATION

- A. Install cable concealed. Routed Free above ceilings or fished in walls.
- B. Supports shall be attached to the building structure and shall have a maximum spacing of every 5 feet. Cable shall be racked neatly and must be protected from other building members in the ceiling space and must not be tied to or draped over fire, electrical, or other utility systems. Cable shall not be allowed to lay on ceiling tiles: it shall be neatly racked and tied up off of the ceiling structures.
- C. Provide a metal cut-in ring with a screw-down fastener of appropriate size for mounting the outlet where cables are fished in walls.
- D. Category 6 Cable Terminations:
 1. Category 6 termination techniques shall be followed, including, but not limited to: no more than 1/2 inch unsheathed wire, wire shall not be untwisted to ease termination, and the bend radius of the installed wire shall be adhered to.
 2. In communications Distribution Frames, all category 6 cables shall be terminated in category 6 compliant high-density patch panels wired to the EIA/TIA 568B standard. These panels are described in later sections.
 3. Category 6 Cable Identification:

- a. Each jack shall be uniquely numbered in typewritten ink on the face/cover plate. The jack numbering scheme shall consist of 4 characters, the first of which is a Distribution Frame letter designation, the remaining three characters shall be the jack number within that Distribution Frame.
- b. All jacks in a single outlet shall have consecutive jack numbers.
- c. The category 6 cabling will be labeled on the patch panels at the MDF location with both the room number and jack number assigned (e.g. A002). The jack numbers shall be terminated sequentially in the patch panels.

3.02 NETWORK SWITCH

A. General

Provide network switch as required for termination of Spectrum Communication service cable. Allow rack space for installation of future fiber optic cable switch.

3.03 PATCH PANELS

A. General:

- 1. Provide a patch panel system in the communications Distribution Frames that provide the capability of having completely tool-free capability for moves/adds/changes for both phone and data communications systems. This means that all twisted pair wiring will be terminated in patch panels (with exceptions as noted below).

3.04 NETWORK EQUIPMENT RACK

- 1. All panels and switches shall be mounted in a free-standing open rack. Racks shall be securely mounted to the floor and have overhead ladder racking for cable management and earthquake support.
- B. Main Distribution Frame (MDF) Construction:
 - 1. Provide as follows:
 - a. A 4x8 sheet of 3/4" plywood, painted with a fire resistant paint (grey or white in color) mounted behind or beside the relay rack.
 - b. Provide free standing, seven-foot or wall mount relay rack installed as indicated in later sections.
 - c. A 6 AWG insulated ground wire to the ground bus of the service electrical panel, to be used for bonding racks and backbone cables.

3.05 TESTING AND QUALITY CONTROL

A. General:

- 1. The contractor must perform all testing as outlined in later sections to assure themselves and the district that the cable has been placed with sufficient care to provide the necessary performance.
- 2. The installer shall comply with all manufacturers instructions for installation of all products.
- 3. All cables, wires, and equipment shall be firmly held in place. Fastenings and support shall be adequate to support their load with ample safety factors.
- 4. All category 6 installation techniques shall be followed, including, but not limited to: wire shall be handled properly to avoid damage, no more than 1/2 inch unsheathed wire, wire shall not be untwisted to ease termination and bend radius of the installed wire shall be adhered to.
- 5. Proper installation techniques must be followed when installing the CATV coaxial cable. Particular care must be taken to avoid kinking or otherwise damaging the coaxial cable.
- 6. All test results will be submitted as part of the as-built documentation.

B. Category 6 Testing:

1. All category 6 cables must pass the most stringent category 6 tests built into the category 6 test device.
2. The contractor shall guarantee category 6 performance on all category 6 cables.

3.06 ACCEPTANCE

- A. Upon receipt of the Contractor's documentation of cable testing, the Engineer will review the installation and may request a test in his presence, of up to 1% of the cables/ wires installed.

3.07 FACEPLATE SCHEDULE

- A. Provide (2) Category 6 jacks at each network faceplate location shown on drawings.

END OF SECTION

SECTION 28 2330
FIRE ALARM SYSTEM

PART 1 GENERAL

1.01 SUMMARY

- A. Under alternate bid furnish and install fire alarm devices, as specified herein and indicated on the drawings.
- B. The system shall include signal initiating devices, audible and visual alarm devices, a wiring system and all accessory devices required to provide a complete operating system.

1.02 SUBMITTALS

- A. Submit complete and descriptive shop drawings in accordance with Section 26 01 00.
- B. Submit plans and specifications to the local fire marshal. Obtain his written acceptance of the system prior to beginning work and ordering equipment.

1.03 OPERATION AND MAINTENANCE DATA

- A. Submit data under provisions of Section 26 01 00.
- B. Install an additional manual inside the fire alarm control panel.
- C. Include operating instructions, and maintenance and repair procedures, including trouble shooting procedures.
- D. Include manufacturer representative's letter stating that system is operational.

1.04 REFERENCES

- A. NFPA 72 - National Fire Alarm Code.
- B. NFPA 101 - Life Safety Code.
- C. IBC – International Building Code.

PART 2 - PRODUCTS

2.01 APPROVED MANUFACTURERS – FIRE ALARM SYSTEM

- A. Silent Knight.
- B. GE
- C. Notifier
- D. Siemens
- E. Potter

- F. Substitutions: Under provisions of Section 260000.

2.02 FIRE ALARM CONTROL PANEL

- A. Construction shall be modular with solid state microprocessor based electronics. An 80 character minimum alphanumeric display shall indicate alarms supervisory service conditions and any troubles.
- B. The control panel shall contain the following:
 - 1. 80 character LCD display.
 - 2. Minimum of two (2) indicating appliance circuits.
 - 3. Non-volatile EEPROM memory.
 - 4. Multiple password levels.
 - 5. RS232 port for programming and printer and Video Display Unit input/output

2.03 INITIATING DEVICES

- A. Ceiling Mounted Smoke Detector:
 - 1. NFPA 72E.
 - 2. Addressable Photoelectric type.
 - 3. Plug-in base.

2.04 SIGNALING DEVICES

- A. Alarm Lights:
 - 1. NFPA 72G.
 - 2. Strobe lamp and flasher with red lettered FIRE on white lens.
 - 3. Contractor is responsible for selecting the appropriate candela rating of visual appliances based on room size and configuration.
- B. Alarm Horn:
 - 1. NFPA 72G.
 - 2. Flush type.
 - 3. Sound Rating: 87 db at 10 feet.
 - 4. Provide integral strobe lamp and flasher with red lettered FIRE on white lens.

2.05 AUXILIARY DEVICES

- A. Digital Communicator: Provides signal to UL approved central station upon initiation of alarm. Provide cell dialer at fire alarm panel for alarm reporting.
- B. Remote power supplies: Provide power supplies, located adjacent to fire alarm panel, for powering notification appliances. Size power supply for devices shown on drawings with 25% spare capacity.

2.06 FIRE ALARM WIRE AND CABLE

- C. Fire Alarm Power Branch Circuits: Building wire as specified in Section 26 0519.
- D. Initiating and Signal Circuits:
 - 1. Building wire as specified in Section 26 0519.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install system in accordance with manufacturer's instructions.
- B. Mounting Heights:
 - 1. Manual station with operating handle 54 inches above floor.
 - 2. Audible and visual signal devices 90 inches above floor.
- C. Wire:
 - 1. Furnish and install all required wiring in accordance with Local and National Codes and Article 210 of the National Board of Fire Underwriter's Standard Number 72.
 - 2. 14 AWG minimum size conductors for fire alarm detection and signal circuit conductors or as per manufacturer's recommendations and as per NEC.
 - 3. Fire alarm rated cable is allowed to be run open where not subject to damage. Install wiring in conduit where subject to damage.
- D. The Contractor shall test all conductors for ground before making final wiring connections. This shall be done with a megger insulation tester or equal.
- E. All "J" boxes for fire alarm system shall be painted red and labeled in white letters, minimum 1/4" "fire alarm".
- F. Refer to mechanical drawings for quantity, location and type of device to be connected to the fire alarm system.

3.02 FIELD QUALITY CONTROL

- A. Field testing will be performed under provisions of Section 26 0000.
- B. Test in accordance with NFPA 72H and local fire department requirements.

3.03 MANUFACTURER'S FIELD SERVICES

- A. Provide manufacturer's field services under provisions of Section 26 0000.
- B. Include services of factory trained representative to supervise installation, adjustments, final connections, and system testing.

3.04 INSPECTION AND TESTS UPON COMPLETION OF SYSTEM

- A. Check out and final connections to the fire alarm control panel shall be made by factory trained technicians in the employ of a factory authorized franchised dealer for the products installed. In addition, factory trained technicians shall demonstrate operation of the complete system and each major component to the Owner.
- B. The system, upon completion of installation by the Electrical Contractor, shall be checked out and all connections to initiating and indicating devices shall be supervised by factory trained technicians in the employ of a factory franchised dealer for the product installed. Each individual device shall be checked out and tested for operation by a factory trained technician.
- C. System field wiring diagrams shall be provided to the Electrical Contractor by the system manufacturer prior to installation.
- D. Tests by the Electrical Contractor shall include tests for grounds and short circuits, continuity tests of exterior circuit. Performance of controls and all initiating and indicating devices shall be made

by the factory trained technicians in the employ of a factory authorized franchised dealer for the product installed.

- E. The report covering these tests and inspection will be submitted direct to the Architect in triplicate.
- F. Documentation from the manufacturer shall be presented to the Architect and/or Engineer upon request indicating that the persons making the final connections and check out are factory trained technicians in the employ of a factory authorized franchised dealer for the products installed.
- G. The system, upon completion of installation by the Electrical Contractor, shall be tested. All initiating devices and indicating devices and control functions shall be tested for operation.
 - 1. The completed Fire Alarm System shall be fully tested (100% point tested) in accordance with NFPA 72 by the Contractor in the presence of the Owner's Representative and the local Fire marshal.
 - 2. The test shall be supervised by factory trained technicians in the employ of a factory franchised dealer for the product installed.
 - 3. Each individual device shall be checked out and tested for operation by a factory trained technician.
 - 4. Upon completion of a successful test, the Contractor shall so certify in writing to the Owner and Architect.

3.05 WARRANTY

- A. The Contractor shall warrant the completed Fire Alarm System wiring and equipment to be free from inherent mechanical and electrical defects for a period of one (1) year from the date of the completed and certified test or from the date of first beneficial use.
- B. The equipment supplier shall make available to the Owner a maintenance contract proposal in compliance with NFPA 72 guidelines.

END OF SECTION