EUGENE SCHOOL DISTRICT 4J

Churchill High School Wood Shop Remodel

CIP Project # 464.678.060

Project Manual

100% Construction Documents
9 September 2020

ROWELL BROKAW

1203 Willamette
Suite 210
Eugene, Oregon 97401
541 485 1003
rowellbrokaw.com

Architecture. Design. Strategy

SECTION 00 0103

PROJECT DIRECTORY

PART 1 GENERAL

1.01 **SECTION INCLUDES**

A. Identification of project team members and their contact information.

1.02 **OWNER:**

A. Name: Eugene School District 4J.
   1. Address: 200 North Monroe St..
   2. City: Eugene.
   3. State: OR.
   4. Zip Code: 97402.

B. Primary Contact: All correspondence from the Contractor to the Architect will be direct, with copies to this party, unless alternate arrangements are mutually agreed upon at preconstruction meeting.
   1. Title: Facilities Manager.
   2. Name: Dexter Rummel.
   3. Email: Rummel_D@4j.lane.edu.

1.03 **CONSULTANTS:**

A. Architect: Design Professional of Record. All correspondence from the Contractor regarding construction documents authored by Architect's consultants will be through this party, unless alternate arrangements are mutually agreed upon at preconstruction meeting.
   1. Company Name: Rowell Brokaw.
      a. Address: 1203 Willamette, Suite 210.
      b. City: Eugene.
      c. State: OR.
      d. Zip Code: 97401.
   2. Primary Contact:
      a. Title: Project Manager.
      b. Name: Paul Harman.
      c. Email: paul@rowellbrokaw.com.
   3. Secondary Contact:
      a. Title: Principal.
      b. Name: Mark Young.
      c. Email: mark@rowellbrokaw.com.

B. Structural Engineering Consultant:
   1. Company Name: Branch Engineering.
      a. Address: 310 5th St..
      b. City: Springfield.
      c. State: OR.
      d. Zip Code: 97477.
   2. Primary Contact:
      a. Title: Project Engineer.
      b. Name: Rick Hernandez.
      c. Email: rick@branchengineering.com.

C. Mechanical Engineering Consultant:
   1. Company Name: PAE.

a. Address: 44 West Broadway, Suite 430.
b. City: Eugene.
c. State: OR.
d. Zip Code: 97401.

2. Primary Contact:
a. Title: Project Engineer.
b. Name: Jack Yousey.
c. Email: jack.yousey@pae-engineers.com.

D. Electrical/Low Voltage Engineering Consultant:
1. Company Name: JLG Engineering, LLC.
a. Address: 31910 Owl Road.
b. City: Eugene.
c. State: OR.
d. Zip Code: 97405.

2. Primary Contact:
a. Title: Project Engineer.
b. Name: Jeff Graper.
c. Email: jeffgraper@jlgengineering.com.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 00 0110

TABLE OF CONTENTS

END OF SECTION

DOCUMENT 00 1113
INVITATION TO BID

Electronic bids will be received by Diana McElhinney, CIP Management Assistant, for the 4J Churchill High School Wood Shop Remodel Project. Bids are due at 2:00 PM Tuesday, September 22, 2020 via email to: cip@4j.lane.edu. There will not be a public opening. However, bid results will be posted on the 4j hyperlink listed below, following the deadline for submission of Bids. Late Bids will not be considered. Bidders are encouraged to send a test email to email address above to ensure they have it correct and that we receive it accordingly. For purposes of receipt time, the sent timestamp from the bidder's email account will be used.

Briefly, the work is described as the renovation of an existing large classroom into a Wood Shop. The Project will be a single design and bid package.

Beginning Thursday, September 10, 2020, Prime Bidders, Sub-bidders and Suppliers may obtain bidding documents at the following hyperlink: **http://www.4j.lane.edu./bids/.** Hard copies are not provided by the School District. It is the responsibility of all Prime Bidders, Sub-bidders, and Suppliers to obtain Bidding Documents and all Addenda from the hyperlink.

A non-mandatory pre-bid conference and walk-through has been scheduled for Tuesday, September 15, 2020 at 1:00 PM. The location of the conference will be Churchill High School, 1850 Bailey Hill Road, Eugene, OR. Statements made by the District's representatives at the conference are not binding upon the District unless confirmed by Written Addendum. Pre-qualification of bidders is not required.

Each Bid must be submitted on the prescribed form and accompanied by a Surety Bond, Cashier's Check, or Certified Check, executed in favor of Eugene School District 4J, in the amount not less than ten percent (10%) of the total bid, based upon the total bid amount for those items bid upon.

Either with the Bid, or within two working hours of the Deadline for Submission of Bids, bidders shall electronically submit, on the form provided, information regarding first-tier subcontractors furnishing labor or labor and materials, as provided in ORS 279C.370. Bids for which disclosure forms are required, but not submitted, will be rejected.

No bid for a construction contract will be received or considered unless the Bidder is registered with the Construction Contractors Board or licensed by the State Landscape Contractors Board at the time the Bid is made, as required by OAR 137-049-0230.

For every bid $100,000 or greater, all Contractors and Subcontractors shall have a public works bond, in the amount of $30,000, filed with the Construction Contractors' Board (CCB), before starting work on the project, unless exempt. A copy of the Contractors' BOLI Public Works Bond shall be provided with the executed contract documents.

Each Bid shall contain a statement indicating whether the Bidder is a "resident bidder", as defined in ORS 279A.120.

Each Bid shall contain a statement that the "Contractor agrees to be bound by and will comply with the provisions of ORS 279C.800 through 279C.870 regarding payment of Prevailing Wages".

Contractor shall certify nondiscrimination in obtaining required subcontractors, in accordance with ORS 279A.110(4).

School District 4J reserves the right to (1) reject any or all Bids not in compliance with all public bidding procedures and requirements, (2) postpone award of the Contract for a period not to exceed sixty (60) days from the date of bid opening, (3) waive informalities in the Bids, (4) select the Bid which appears to be in the best interest of the District, or (5) reject any or all Bids.

Date: September 10, 2020

By: Diana McElhinney, CIP Management Assistant

Published:

Daily Journal of Commerce

Register Guard

Oregon Public Information Network (ORPIN) https://orpin.oregon.gov/

Eugene School District 4J: https://www.4j.lane.edu/

LEGEND

Rebar

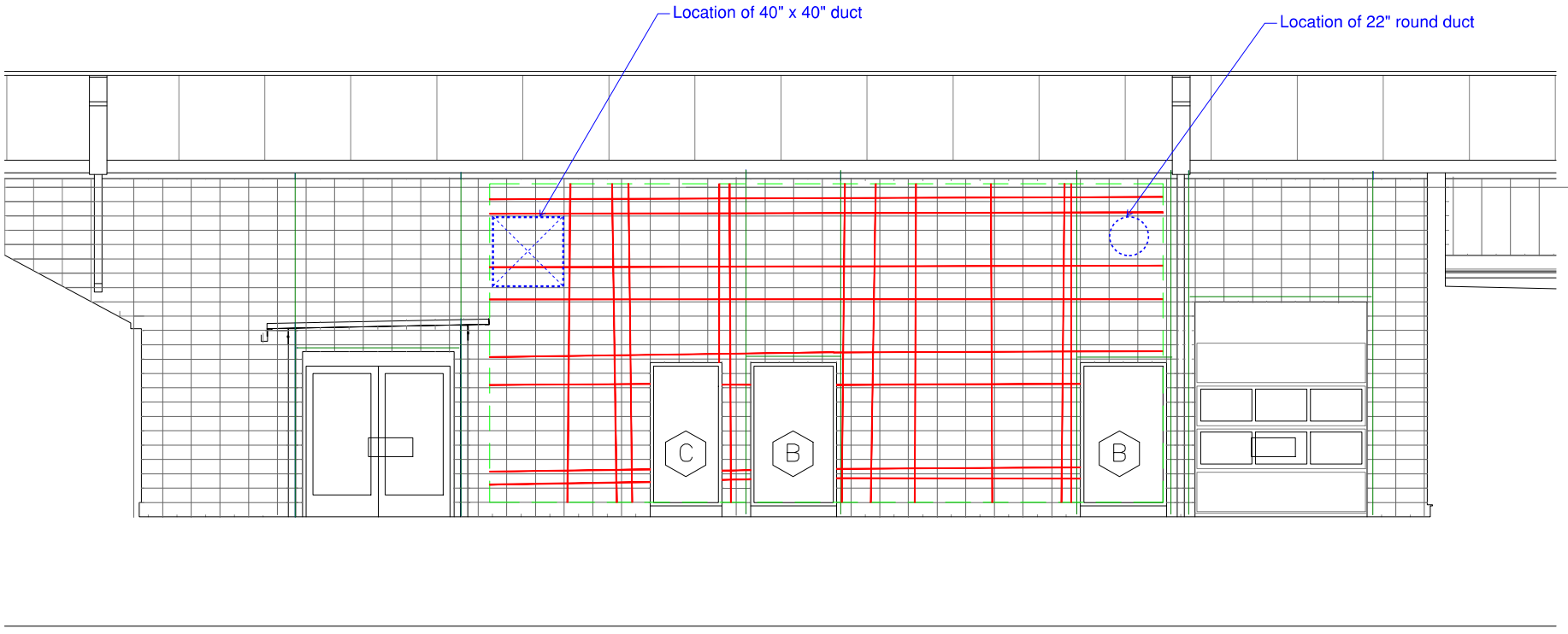
Scanned Area

GPR Data General Notes

- Vertical reinforcing projected at #5 rebar.
- Horizontal reinforcing projectd at #4 rebar.
- All cells in scanned area appear to be grouted.

*Notes pertain only to areas scanned by GPR Data

0 5 10 Feet



Drawn by: Billy Malone (254) 855-1956

Reviewed by: Matthew Edwards (541)228-6851

Churchill High School Woodshop

Eugene School District 4J

REVISIONS

Description	Date
New Document	07/29/2020

CIP Project # 464.678.000

CMU Wall

Sheet 1 of 1

SECTION 00 3100
AVAILABLE PROJECT INFORMATION

PART 1 GENERAL

1.01 EXISTING CONDITIONS

A. Certain information relating to existing surface and subsurface conditions and structures is available to bidders but will not be part of Contract Documents, as follows:

B. GPR Survey of Existing CMU Wall: is attached to this section.
   1. This survey identifies reinforcement in the CMU wall that will be cut for duct penetrations.

C. Existing Conditions GPR Survey: Entitled GPR Data, dated July 28, 2020.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

DOCUMENT 00 4100
BID FORM

BID FOR: 4J Churchill High School Wood Shop Remodel — CIP Number: 464.678.060

Submitted to: Facilities Management
Eugene School District 4J
715 West Fourth Avenue
Eugene, Oregon 97402

Bid Deadline: 2:00 PM
September 22, 2020

Submitted by: _____
(Company Name)

BASE BID
The undersigned proposes to furnish all material, equipment, and labor required for the complete project, and to perform all work in strict accordance with the Contract Documents for the lump sum prices indicated below with completion occurring on or prior to the dates indicated:

BASE BID:

Bid: _____ $ _____
(Words) (Figures)

The undersigned agrees, if awarded the Contract, to substantially complete all Base Bid Work on or before the dates specified in Section 01 1000 - Summary.

BID SECURITY
Accompanying herewith is Bid Security, which is not less than ten percent (10%) of the total amount of the Base Bid plus additive alternates, plus total Allowances.

STIPULATIONS
The undersigned acknowledges the liquidated damages provision included in the Supplementary Conditions.

The undersigned agrees, if awarded the contract, to comply with the provisions of Oregon Revised Statutes 279C.800 through 279C.870 pertaining to the payment of prevailing rates of wage.

The undersigned agrees, if awarded the Contract, to execute and deliver to the Owner within ten (10) working days after receiving contract forms, a signed Agreement and a satisfactory Performance Bond and Payment Bond each in an amount equal to 100 percent (100%) of the Contract Sum.

For every Agreement of $100,000 or greater in value, all Contractors and Subcontractors shall have a public works bond in the amount of $30,000, filed with the Construction Contractors' Board (CCB), in compliance with ORS 279C.836, before starting work on the project unless exempt. Contractor agrees to provide a copy of the Contractor's BOLI Public Works bond with the signed Agreement as Specified in the Supplementary Conditions.

The undersigned agrees that the Bid Security accompanying this proposal is the measure of liquidated damages which the Owner will sustain by the failure of the undersigned to execute and deliver the above named agreement and bonds; and that if the undersigned defaults in executing that agreement within ten (10) days after forms are provided or providing the bonds, then the Bid Security shall become the property of the Owner; but if this proposal is not accepted within sixty (60) days of the time set for the opening of bids, or if the undersigned executes and delivers said agreement and bonds, the Bid Security shall be returned.

By submitting this Bid, the Bidder certifies that the Bidder:
a) has available the appropriate financial, material, equipment, facility and personnel resources and expertise, or the ability to obtain the resources and expertise, necessary to meet all contractual responsibilities;
b) has a satisfactory record of past performance;
c) has a satisfactory record of integrity, and is not disqualified under ORS 279C.440;
d) is qualified legally to contract with the Owner; and
e) will promptly supply all necessary information in connection with any inquiry the Owner may make concerning the responsibility of the Bidder.

Prior to award of a Contract, the Bidder shall submit appropriate documentation to allow the Owner to determine whether or not the Bidder is "responsible" according to the above criteria.
The contractor agrees with the provisions of Oregon Revised Statutes 279C.505, which requires that the contractor shall demonstrate it has established a drug-testing program for employees and will require each subcontractor providing labor for the Project to do the same.

The undersigned has received addenda numbers _____ to _____ inclusive and has included their provisions in the above Bid amounts.

The undersigned has visited the site to become familiar with conditions under which the Work is to be performed and has correlated the Bidder's personal observations with the requirements of the proposed Contract Documents.

The undersigned certifies that the Bidder is a _____ Bidder under ORS.
("Resident" or "Non-resident", to be filled in by Bidder)

Names of Firm: _____

Street Address: _____
(City) (State) (Zip)

Telephone Number: _____ FAX Number: _____

Email Address: _____

Signed By: _____ Printed Name:_____
(Signature of Authorized Official. If bid is from a partnership, one of the partners must sign bid).

Date Signed: _____

Official Capacity: _____

If corporation, attest: _____ Date: _____
(Secretary of Corporation)

SEAL (If Corporate)

_____ Corporation
_____ Partnership
_____ Individual

Enclosed: Bid Security

NON-DISCRIMINATION REQUIREMENT

Contractor certifies that the Contractor has not discriminated against minorities, women or emerging small business enterprises in obtaining any required subcontracts.

The Contractor agrees not to discriminate against any client, employee, or applicant for employment or for services, because of race, color, religion, sex, national origin, physical or mental handicap, sexual orientation or age, unless based upon bona fide occupational qualifications, and that they are otherwise in compliance with all federal, state and local laws prohibiting discrimination, with regard to, but not limited to, the following: Employment upgrading, demotion or transfer; Recruitment or recruitment advertising; Layoffs or termination; Rates of pay or other forms of compensation; Selection for training; Rendition of services. It is further understood that any vendor who is in violation of this clause shall be barred forthwith from receiving awards of any purchase order from the School District, unless a satisfactory showing is made that discriminatory practices have terminated and that a recurrence of such acts is unlikely.

FIRM NAME: _____

ADDRESS: _____

TELEPHONE: _____

BY: _____
(Company or Firm Officer)

BY: _____
(Type or Print Name)

NON-COLLUSION AFFIDAVIT

STATE OF _____)

County of _____)

I state that I am _____ of_____
(Title) (Name of Firm)
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:

(1) 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.

(2) 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 disclosed to any other firm or person who is a bidder or potential bidder, and they will not be disclosed before bid opening.

(3) 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.

(4) 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 noncompetitive bid.

(5) _____, its affiliates, subsidiaries, officers, directors and
(Name of my Firm)
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 _____ understands and acknowledges that the above representations
(Name of my Firm)
are material and important, and will be relied on by School District 4J 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 School District 4J of the true facts relating to the submission of bids for this contract.

_____
(Authorized Signature)

Sworn to and subscribed before me this _____ day of _____, 20

_____
(Notary Public for Oregon)

My Commission Expires: _____

END OF BID FORM

DOCUMENT 00 4522
FIRST-TIER SUBCONTRACTOR DISCLOSURE FORM

PROJECT: 4j Churchill High School Wood Shop Remodel **CIP NUMBER: 464.678.060**

TO: Kathi Hernandez, Facilities Management Assistant
Eugene School District 4J
715 West Fourth Avenue
Eugene, Oregon 97402

BID SUBMISSION DEADLINE: **Date:** September 22, 2020 **Time:** 2:00pm

SUBMITTAL REQUIREMENTS
Subcontractor disclosure is required on all public improvement contracts greater than $100,000.

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 will be furnishing labor or labor and materials, and 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.)

SUBCONTRACTOR	DOLLAR VALUE	CATEGORY OF WORK
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

The above listed first- tier subcontractor(s) are providing labor, or labor and material, with a Dollar Value equal to or greater than:

a) 5% of the total Contract Price, but at least $15,000. [If the Dollar Value is less than $15,000 do not list the subcontractor above.]
b) $350,000 regardless of the percentage of the total Contract Price

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:** _____

Signature: _____

END OF DOCUMENT 00 45 22

AIA® Document A101® – 2017

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

AGREEMENT made as of the day of in the year
(In words, indicate day, month and year.)

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

Eugene School District 4J
715 West 4th Avenue
Eugene, Oregon 97402
Phone: 541-790-7417
CIP No.464.678.060

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

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

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

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

4J Churchill High School Wood Shop Remodel
1850 Bailey Hill Road
Eugene OR 97405

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

Rowell Brokaw Architects, PC
1203 Willamette, Suite 210
Eugene, OR 97401

The Owner and Contractor agree as follows.

Init.
/

TABLE OF ARTICLES

ARTICLE 1 THE CONTRACT DOCUMENTS

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

ARTICLE 2 THE WORK OF THIS CONTRACT

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

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

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

[ ] The date of this Agreement.

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

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

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

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion

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

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

[ ] By the following date:

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

Portion of Work	Substantial Completion Date

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

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be ($), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

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

Item	Price

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

Item	Price	Conditions for Acceptance

§ 4.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

Item	Price

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

Item	Units and Limitations	Price per Unit ($0.00)

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

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

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

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

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

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

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

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

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

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

- **.1** That portion of the Contract Sum properly allocable to completed Work;
- **.2** That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- **.3** That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

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

- **.1** The aggregate of any amounts previously paid by the Owner;
- **.2** The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;
- **.3** Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- **.4** For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and
- **.5** Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

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

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

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

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:
(Insert any other conditions for release of retainage upon Substantial Completion.)

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

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

§ 5.2 Final Payment

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

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

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

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

§ 5.3 Interest

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

%

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

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

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

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

[ ] Litigation in a court of competent jurisdiction

[ ] Other *(Specify)*

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

ARTICLE 7 TERMINATION OR SUSPENSION
§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

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

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

ARTICLE 8 MISCELLANEOUS PROVISIONS
§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

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

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

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

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

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

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

§ 8.7 Other provisions:

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

.1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor

.2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds

.3 AIA Document A201™–2017, General Conditions of the Contract for Construction

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

.5 Drawings

Number	Title	Date

.6 Specifications

Section	Title	Date	Pages

.7 Addenda, if any:

Number	Date	Pages

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

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

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

[ ] The Sustainability Plan:

Title	Date	Pages

[ ] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

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

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

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

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, Gregory Brokaw, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification 19:01:16 ET on 09/07/2020 under Order No. 9745482038 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A101™ - 2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, as published by the AIA in its software, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

_____

(Signed)

_____

(Title)

_____

(Dated)

AIA® Document A201® – 2007

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)
Churchill High School Woodshop Remodel
1850 Bailey Hill Road
Eugene, Oregon 97405

THE OWNER:
(Name, legal status and address)
Eugene School District 4J
715 West 4th Avenue
Eugene, Oregon 97402
Phone: 541-790-7417
CIP No. 464.678.060

THE ARCHITECT:
(Name, legal status and address)
Rowell Brokaw Architects, PC
1203 Willamette, Suite 210
Eugene, OR 97401
Phone: 541-485-1003

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

TABLE OF ARTICLES

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INDEX
(Topics and numbers in bold are section headings.)

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding requirements.

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a ~~Modification.~~ Modification including a GMP Amendment. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a ~~Sub-subcontractor,~~ Sub-subcontractor except as set forth in Section 5.3 and Section 5.4, (3) between the Owner and the Architect or the Architect's consultants or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 THE PROJECT

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

§ 1.1.5 THE DRAWINGS

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

§ 1.1.6 THE SPECIFICATIONS

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

§ 1.1.7 INSTRUMENTS OF SERVICE

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 INITIAL DECISION MAKER

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.1.9 KNOWLEDGE

The terms "knowledge," "recognize," and "discover," their respective derivatives, and similar terms in the Contract Documents, as used in reference to the Contractor, shall be interpreted to mean that which the Contractor knows (or should know), recognizes (or should recognize), and discovers (or should discover) in exercising the care, skill, and diligence required of a general commercial contractor. Analogously, the expression "reasonably inferable" and similar

terms in the Contract Documents shall be interpreted to mean reasonably inferable by a contractor familiar with the Project and exercising the care, skill, and diligence required of a general commercial contractor.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results. In the event of inconsistencies within or between parts of the Contract Documents, or between the Contract Documents and applicable standards, codes, and ordinances, the Contractor shall (i) provide the better quality or greater quantity of Work or (ii) comply with the more stringent requirement; either or both in accordance with the Architect's interpretation. The terms and conditions of this Section 1.2.1, however, shall not relieve the Contractor of any of the obligations set forth in Sections 3.2 and 3.7.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings. Dimensions not expressly provided in the Contract Documents are to be computed, rather than determined by scale or rule.

§ 1.3 CAPITALIZATION

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

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

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner

or the Owner's authorized representative. Dexter Rummel is designated by the Owner as its representative and is authorized to act on behalf of the Owner, unless a new representative is subsequently designated in writing by the Owner.

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the portion of the Work affected by a material change. ~~After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.~~

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure the building permits and pay for necessary approvals, easements, assessments and charges required for ~~construction,~~ use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 ~~The Owner shall furnish~~ Except to the extent required for execution of the Work and requested by the Contractor in writing, the Owner shall not furnish any surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, ~~and~~ but shall provide a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

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

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

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

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ~~ten-day~~ seven-day period after receipt of written notice from the Owner (except no notice shall be required in the event of an emergency) to commence and continue correction of such default or neglect with diligence and promptness, the Owner ~~may,~~ may (but shall not be obligated to), without prejudice to other remedies the Owner may have, commence and continue to carry out the Work, including, without limitation, to correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. ~~Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect.~~ If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

§ 2.5 EXTENT OF OWNER RIGHTS

The rights stated in this Article 2 and elsewhere in the Contract Documents are cumulative and not in limitation of any rights of the Owner (i) granted in the Contract Documents, (ii) at law, or (iii) in equity.

In no event shall the Owner have control over, charge of, or any responsibility for construction means, methods, techniques, sequences, or procedures or for safety precautions and programs in connection with the Work, notwithstanding any of the rights and authority granted the Owner in the Contract Documents.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

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

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

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

§ 3.1.4 Unless otherwise directed by the Architect, the Contractor shall perform all Work in accordance with product manufacturers' recommendations or directions for best results. No preparatory step or installation procedure may be omitted unless specifically authorized by the Contract Documents or at the direction of the Architect. Conflicts among manufacturers' directions or the Contract Documents shall be resolved by the Architect.

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents. Prior to execution of the Agreement, the Contractor and each Subcontractor have evaluated and satisfied themselves as to the conditions and limitations under which the Work is to be performed, including, without limitation, (i) the location, condition, layout, and nature of the Project site and surrounding areas, (ii) generally prevailing climatic conditions, (iii) anticipated labor supply and costs, (iv) availability and cost of materials, tools, and equipment, and (v) other similar issues. The Owner assumes no responsibility or liability for the physical condition or safety of the Project site or any improvements located on the Project site. Except as set forth in Section 10.3, the Contractor shall be solely responsible for providing a safe place for the performance of the Work. The Owner shall not be required to make any adjustment in either the Contract Sum or the Contract Time in connection with any failure by the Contractor or any Subcontractor to have complied with the requirements of this Section 3.2.1.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the design information contained in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Owner or the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

The exactness of grades, elevations, dimensions, or locations given on any Drawings issued by the Architect, or the work installed by other contractors, is not guaranteed by the Architect or the Owner.

The Contractor shall, therefore, satisfy itself as to the accuracy of all grades, elevations, dimensions, and locations. In all cases of interconnection of its Work with existing or other work, it shall verify at the site all dimensions relating to such existing or other work. Any errors due to the Contractor's failure to so verify all such grades, elevations, dimensions, or locations shall be promptly rectified by the Contractor without any additional cost to the Owner.

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

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the ~~Contract, unless the Contract Documents give other specific instructions concerning these matters.~~ Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. ~~If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.~~

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

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.3.4 The Contractor must notify the District Facilities Director and Owner's Representative prior to the interruption of any utility or operating system, regardless of the area it services. The specific schedule for all interruptions in services must be coordinated through the Owner's Representative.

§ 3.3.5 The Contractor and its Subcontractors may not use the Owner's tools, equipment, or materials unless authorized in advance by the Owner's Representative.

§ 3.3.6 If the Contractor reasonably believes that suspension of the Work is warranted by reason of unforeseen circumstances that could adversely affect the quality of the Work if the Work were continued, the Contractor shall immediately notify the Owner and the Architect and describe with particularity the reasons therefor. Except as stated elsewhere in the Contract Documents or in an emergency, the Contractor shall not suspend the Work until it receives approval from the Owner.

§ 3.3.7 It is understood and agreed that the relationship of Contractor to Owner shall be that of an independent contractor under ORS 670.600. Nothing contained in this Agreement or inferable from this Agreement shall be deemed or construed to (a) make Contractor the agent, servant, or employee of the Owner; or (b) create any

partnership, joint venture, or other association between Owner and Contractor. Any direction or instruction by Owner or any of its authorized representatives in respect to the Work shall relate to the results the Owner desires to obtain from the Work, and shall in no way affect Contractor's independent contractor status.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the prior written consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

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

§ 3.4.4 The Contractor shall only employ or use labor in connection with the Work capable of working harmoniously with all trades, crafts, and any other individuals associated with the Project. The Contractor shall also use best efforts to minimize the likelihood of any strike, work stoppage, or other labor disturbance and shall not be entitled to any increase in the Contract Sum in the event of a labor dispute.

.1 If the Work is to be performed by trade unions, the Contractor shall make all necessary arrangements to reconcile, without delay, damage, or cost to the Owner and without recourse to the Architect or the Owner, any conflict between the Contract Documents and any agreements or regulations of any kind at any time in force among members or councils that regulate or distinguish the activities that shall not be included in the work of any particular trade.

.2 In case the progress of the Work is affected by any undue delay in furnishing or installing any items or materials or equipment required under the Contract Documents because of such conflict involving any such labor agreement or regulation, the Owner may require that other material or equipment of equal kind and quality be provided pursuant to a Change Order or Construction Change Directive.

§ 3.5 WARRANTY

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the ~~Architect,~~ Architect or the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. The Contractor agrees to assign to the Owner at the time of final completion of the Work any and all manufacturers' warranties relating to materials and labor used in the Work and further agrees to perform the Work in such manner so as to preserve any and all such manufacturers' warranties. The Contractor further warrants the building envelope and penetration components against defects in materials and workmanship for a period of two-years following the date of Substantial Completion in accordance with ORS 701.340 and shall annually inspect the same. If, after 15 days' written notice, the Contractor fails to proceed to cure any breach of this warranty, the Owner may have the defects corrected and the Contractor and its surety, if any, shall be liable for all expense incurred. In case of an emergency where, in the opinion of the Owner or the Architect, delay would cause serious loss or damage, if any, corrective work may be undertaken without advance notice to the Contractor, but the Contractor and its surety shall remain liable for all expenses incurred.

§ 3.6 TAXES

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor and all Social Security and withholding payments that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

§ 3.7.1 ~~Unless otherwise provided in the Contract Documents,~~ Except for the building permit which will be paid for by the Owner, the Contractor shall secure and pay for ~~the building permit as well as for other~~ all permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the ~~Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.~~ Work.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15.

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

§ 3.8 ALLOWANCES

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

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- **.1** Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- **.2** Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- **.3** Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a competent Project Manager, superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The ~~superintendent~~ Project Manager shall

represent the Contractor, and communications given to the ~~superintendent~~ Project Manager shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed Project Manager and superintendent. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed Project Manager and superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed Project Manager or superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the Project Manager or superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.10.4 The construction schedule shall be submitted together with the GMP and shall be in a detailed precedence-style critical path management ("CPM") or primavera-type format satisfactory to the Owner and the Architect that shall also (i) provide a graphic representation of all activities and events that will occur during performance of the Work; (ii) identify each phase of construction and occupancy; and (iii) set forth dates that are critical in ensuring the timely and orderly completion of the Work in accordance with the requirements of the Contract Documents (hereinafter referred to as "Milestone Dates"). Upon review and acceptance by the Owner and the Architect of the Milestone Dates, the construction schedule shall be deemed part of the Contract Documents and attached to the Agreement as **Exhibit 3,10.4**. If not accepted, the construction schedule shall be promptly revised by the Contractor in accordance with the recommendations of the Owner and the Architect and resubmitted for acceptance. The Contractor shall monitor the progress of the Work for conformance with the requirements of the construction schedule and shall promptly advise the Owner of any delays or potential delays. The accepted construction schedule shall be updated to reflect actual conditions (sometimes referred to in these Supplementary Conditions as "progress reports") as set forth in Section 3.10.1 or if requested by either the Owner or the Architect. In the event any progress report indicates any delays, the Contractor shall propose an affirmative plan to correct the delay, including overtime and/or additional labor, if necessary. In no event shall any progress report constitute an adjustment in the Contract Time, any Milestone Date, or the Contract Sum unless any such adjustment is agreed to by the Owner and authorized pursuant to Change Order.

§ 3.10.5 In the event the Owner determines that the performance of the Work, as of a Milestone Date, has not progressed or reached the level of completion required by the Contract Documents, the Owner shall have the right to order the Contractor to take corrective measures reasonably necessary to expedite the progress of construction, including, without limitation, (i) working additional shifts or overtime, (ii) supplying additional manpower, equipment, and facilities, and (iii) other similar measures (hereinafter referred to collectively as "Extraordinary Measures"). Such Extraordinary Measures shall continue until the progress of the Work complies with the stage of completion required by the Contract Documents. The Owner's right to require Extraordinary Measures is solely for the purpose of ensuring the Contractor's compliance with the construction schedule.

.1 Unless such Extraordinary Measure are necessitated by acts or omission reasonably out of the Contractor's control, the Contractor shall not be entitled to an adjustment in the Contract Sum in connection with Extraordinary Measures required by the Owner under or pursuant to this Section 3.10.5.

.2 The Owner may exercise the rights furnished the Owner under or pursuant to this Section 3.10.5 as frequently as the Owner deems necessary to ensure that the Contractor's performance of the Work will comply with any Milestone Date or completion date set forth in the Contract Documents.

§ 3.10.6 The Owner shall have the right to direct a postponement or rescheduling of any date or time for the performance of any part of the Work that may interfere with the operation of the Owner's premises or any tenants or invitees thereof. The Contractor shall, upon the Owner's request, reschedule any portion of the Work affecting operation of the premises during hours when the premises are not in operation. Any postponement, rescheduling, or performance of the Work under this Section 3.10.6 may be grounds for an extension of the Contract Time, if permitted under Section 8.3.1, and an equitable adjustment in the Contract Sum if (i) the performance of the Work was properly scheduled by the Contractor in compliance with the requirements of the Contract Documents, and (ii) such rescheduling or postponement is required for the convenience of the Owner.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.11.1 The Contractor shall maintain for the Owner one record as-built copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to record field changes and selections made during construction, and one record copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These as-built documents shall incorporate all changes and substitutions to the Work, including without limitation changes or substitutions arising from Change Orders, Construction Change Directives, and details clarified by Requests for Information, Supplemental Instructions or approved Shop Drawings. The Contractor's as-built documentation shall be available to the Architect and the Owner during the course of the Project.

§ 3.11.2 The Contractor shall maintain all approved permit drawings in a manner that will make them accessible at the Project site to governmental inspectors and other authorized agencies. All approved permit drawings shall be wrapped, marked, and delivered to the Owner within sixty (60) days of Substantial Completion.

§ 3.11.3 The Contractor must continuously maintain at the Project site all material safety data sheets, safety records, daily logs, and other Contract documentation necessary to immediately ascertain the safety of the Work and to establish compliance with life safety policies, Hazardous Materials requirements, and the Contract Documents.

§ 3.11.4 The Contractor, with its Subcontractors, will prepare draft record Contract Documents, showing all as-built conditions as required under Section 3.11.1 and the Owner's close-out policies and procedures, and submit them to the Architect for review. Based on the Architect's review and comments, if any, and pursuant to the Owner's close-out policies and procedures, the Contractor will prepare and deliver to the Owner within sixty (60) days of Substantial Completion, final, accurate, and complete record Contract Documents, including without limitation record Drawings and Specifications, showing the exact "as-built" conditions of the Work.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

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

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

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

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors.

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

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

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

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

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design ~~professional,~~ professional who shall comply with the reasonable requirements of the Owner regarding qualifications and insurance, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The ~~Owner~~ Owner, Contractor and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design ~~professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy.~~ professionals. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 USE OF SITE

~~The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.~~ **§ 3.13.1** The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.13.2 Only materials and equipment that are to be used directly in the Work shall be brought to and stored on the Project site by the Contractor. After equipment is no longer required for the Work, it shall be promptly removed from the Project site. Protection of construction materials and equipment stored at the Project site from weather, theft, damage, and all other adversity is solely the responsibility of the Contractor. The Contractor shall ensure that the Work, at all times, is performed in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work shall be performed, to the fullest extent reasonably possible, in such a manner that public areas adjacent to the site of the Work shall be free from all debris, building materials, and equipment likely to cause hazardous conditions.

§ 3.13.3 The Contractor and any entity for whom the Contractor is responsible shall not erect any sign on the Project site without the prior written consent of the Owner, which may be withheld in the sole discretion of the Owner.

§ 3.13.4 Without limitation of any other provision of the Contract Documents, the Contractor shall use best efforts to minimize any interference with the occupancy or beneficial use of (i) any areas and buildings adjacent to the site of the Work and (ii) the Building in the event of partial occupancy, as more specifically described in Section 9.9. Without prior approval of the Owner, the Contractor shall not permit any workers to use any existing facilities at the Project site, including, without limitation, lavatories, toilets, entrances, and parking areas other than those designated by the Owner.

.1 Without limitation of any other provision of the Contract Documents, the Contractor shall use its best efforts to comply with all rules and regulations promulgated by the Owner in connection with the use and occupancy of the Project site and the Building, as amended from time to time. The Contractor shall immediately notify the Owner in writing if during the performance of the Work, the Contractor finds compliance of any portion of such rules and regulations to be impracticable, setting forth the problems of such compliance and suggesting alternatives through which the same results intended by such portions of the rules and regulations can be achieved. The Owner may, in the Owner's sole discretion, adopt such suggestions, develop new alternatives, or require compliance with the existing requirements of the rules and regulations.

.2 The Contractor shall also comply with all insurance requirements and collective bargaining agreements applicable to use and occupancy of the Project site and the Building.

§ 3.14 CUTTING AND PATCHING

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

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

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 ACCESS TO WORK
The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

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

§ 3.18 INDEMNIFICATION
§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), including loss of use resulting therefrom, but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 4 ARCHITECT
§ 4.1 GENERAL
§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

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

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 4.2 ADMINISTRATION OF THE CONTRACT
§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site ~~at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally~~ to become substantially familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the ~~Work, when fully completed,~~ Work will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques,

sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 The Contractor will facilitate and the Architect will participate in weekly meetings with the Contractor and any appropriate consultants at the site to review and discuss progress and any issues. The Contractor will maintain record meeting notes of weekly meetings and will provide these notes to Architect and Owner for their review and comment. On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) ~~known~~ deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies ~~observed~~ in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. If the Architect knows of any Work that does not conform with the Contract Documents, the Architect will promptly notify the Contractor and the Owner in writing of such non-conforming work. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the approved submittal schedule ~~approved by the Architect~~ or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

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

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

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

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

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect in connection with the administration of the Contract will be final if consistent with the intent expressed in the Contract Documents.

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

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

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

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

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 5.2.1 ~~Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract,~~ Within 10 days after the date of the submittal of the GMP, the Contractor shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within ~~14~~ 5 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply within the ~~14-day~~ 5-day period shall constitute notice of no reasonable objection.

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

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 SUBCONTRACTUAL RELATIONS

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

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

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

.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 ~~Upon such assignment, if the Work~~ If the Work in connection with a subcontract has been suspended for more than ~~30 days,~~ thirty (30) days after termination of the Contract by the Owner pursuant to Section 14.2 and the Owner accepts assignment of such subcontract, the Subcontractor's compensation shall be equitably adjusted for ~~increases in cost resulting from~~ any increase in direct costs incurred by such Subcontractor as a result of the suspension.

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

§ 5.4.4 Each subcontract shall specifically provide that the Owner shall only be responsible to the Subcontractor for those obligations that accrue subsequent to the Owner's exercise of any rights under this conditional assignment.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

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

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other

separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

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

§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, negligence, lack of oversight, inattention to detail, breach of the Contract Documents, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor's delays, improperly timed activities, damage to the Work or defective construction.

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

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

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

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

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

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work. Except as permitted in Section 7.3 and Section 9.7.2, a change in the Contract Sum or the Contract Time shall be accomplished only by Change Order. Accordingly, no course of conduct or dealings between the parties, nor express or implied acceptance of alterations or additions to the Work, and no claim that Owner has been unjustly enriched by any alteration of or addition to the Work, whether or not there is, in fact, any unjust enrichment to the Work, shall be the basis of any claim to an increase in any amounts due under the Contract Documents or a change in any time period provided for in the Contract Documents.

§ 7.1.4 The combined overhead and profit included in the total cost or credit to the owner of a change in the Work shall not exceed that stated in 7.1.4.4 below. In no case shall the Contractor's or Subcontractor's individual overhead and profit exceed the following schedule:

.1 For the Contractor, for the Work performed by the Contractor's own forces, 15% of the cost
.2 For the Contractor for the Work performed by the Contractor's Subcontractors, 10% of the amount due to the Subcontractors
.3 For each Subcontractor involved, for Work performed by that Subcontractor's own forces, 10% of the Cost
.4 The Base Cost to which overhead and profit is to be applied shall be determined in accordance with 7.3.7.1 through 7.3.7.5. To this Base Cost is added the applicable overhead and profit. In no case shall the combined overhead and profit (including all Contractor and Subcontractor(s) overhead and profit exceed 25% of the Base Cost.
.5 In order to facilitate checking of quotations for extras or credits, all proposals, except those so minor that their propriety can be seen by inspection shall be accompanied by a complete itemization of costs including those applicable costs from 7.3.7.1 through 7.3.7.5 and Subcontractor and Contractor overhead and profit as applicable.
.6 Costs of preparing Change Order shall not be included in the cost of Change Order.

§ 7.2 CHANGE ORDERS

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:

.1 The change in the Work;
.2 The amount of the adjustment, if any, in the Contract Sum; and
.3 The extent of the adjustment, if any, in the Contract Time.

§ 7.2.2 Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the Work that is the subject of the Change Order, including, but not limited to, all direct and indirect costs and consequential damages associated with such change and any and all adjustments to the Contract Sum and the Contract Time/construction schedule.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
.2 Unit prices stated in the Contract Documents or subsequently agreed upon;
.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
.4 As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

.1 ~~Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;~~The maximum allowable hourly wage for Changes to the Work shall be the appropriate Base Wage Rate plus Fringe Rate as listed for each occupation in the prevailing Wage Rate for Public Works Contracts in Oregon manual issued by the Oregon Bureau of Industries; multiplied by 1.25. An amount for Overhead and Profit may be added in accordance with 7.1.4.4 or 7.1.4.5.

.2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;

.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or ~~others;~~others, at the rates established in the Contract Documents;

.4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and

.5 Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 MINOR CHANGES IN THE WORK

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration; or by other causes that the Architect determines may justify delay, then the Contract Time shall be extended by Change Order ~~for such reasonable time as the Architect may determine.~~ to the extent such actual, direct delay will prevent the Contractor from achieving Substantial Completion within the Contract Time and if the performance of the Work is not, was not, or would not have been delayed by any other cause for which the Contractor is not entitled to an extension in the Contract Time under the Contract Documents. The Contractor further acknowledges and agrees that adjustments in the Contract Time will be permitted for a delay only to the extent such delay (i) is not caused by the Contractor, (ii) could not be limited or avoided by the Contractor's timely notice to the Owner of the delay or reasonable likelihood that a delay will occur, and (iii) is of a duration not less than one (1) day. For clarity, any extension will be net of any delays caused by or due to the fault or negligence of the Contractor and will also be net of any contingency or "float" time allowance included in the Project Schedule.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

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

§ 9.2 SCHEDULE OF VALUES

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Architect, ~~before the first Application for Payment,~~ within ten (10) days of the execution of GMP amendment to this Agreement, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of

requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.1.3 Each Application for Payment shall be accompanied by the following, all in form and substance satisfactory to the Owner: (i) a current Contractor's lien waiver and duly executed and acknowledged sworn statement showing all Subcontractors and material suppliers with whom the Contractor has entered into subcontracts, the amount of each such subcontract, the amount requested for any Subcontractor and material supplier in the requested progress payment, and the amount to be paid to the Contractor for such progress payment, together with similar sworn statements from all such Subcontractors and material suppliers; (ii) duly executed waivers of mechanics' and material suppliers' liens from all Subcontractors and, when appropriate, from material suppliers and lower tier Subcontractors establishing payment or satisfaction of payment of all amounts requested by the Contractor on behalf of such entities or persons in any previous Application for Payment; and (iii) all information and materials required to comply with the requirements of the Contract Documents or reasonably requested by the Owner or the Architect.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work. The Owner reserves the right to settle any disputed mechanic's or material supplier's lien claim by payments to the lien claimant or by such other means as the Owner, in the Owner's sole discretion, determines is the most economical or advantageous method of settling the dispute. The Contractor shall promptly reimburse the Owner, upon demand, for any payments so made.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data

requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- **.1** defective Work not remedied;
- **.2** third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- **.3** failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- **.4** reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- **.5** damage to the Owner or a separate contractor;
- **.6** reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- **.7** repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment.

§ 9.5.4 If the Contractor disputes any determination by the Architect with regard to any Certificate of Payment, the Contractor nevertheless shall expeditiously continue the Work.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

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

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 FAILURE OF PAYMENT

~~If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.~~**§ 9.7.1** If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents. Notwithstanding the foregoing, failure of payment does not exist under Section 9.7.1 if the Owner exercises authority granted by the Contract documents to withhold payment notwithstanding certification by the Architect.

§ 9.7.2 If the Owner is entitled to reimbursement or payment from the Contractor under or pursuant to the Contract Documents, such payment shall be made promptly upon demand by the Owner. Notwithstanding anything contained in the Contract Documents to the contrary, if the Contractor fails to promptly make any payment due the Owner, or if the Owner incurs any costs and expenses to cure any default of the Contractor or to correct defective Work, the Owner shall have an absolute right to offset such amount against the Contract Sum and may, in the Owner's sole discretion, elect either to (i) deduct an amount equal to that which the Owner is entitled from any payment then or thereafter due the Contractor from the Owner, or (ii) issue a written notice to the Contractor reducing the Contract Sum by an amount equal to that which the Owner is entitled.

§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended ~~use.~~use; provided, however, that as a condition precedent to Substantial Completion, the Owner has received all certificates of occupancy and any other permits, approvals, licenses, and other documents from any governmental authority having jurisdiction thereof necessary for the beneficial occupancy of the Project.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the

Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in ~~effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner,~~ effect, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final ~~payment and (5),~~ payment, (5) three (3) bound volumes of all guarantees and warranties on material furnished by all manufacturers and suppliers to the Contractor and all its Subcontractors, with duly executed instruments properly assigning the guarantees and warranties to the Owner, which guarantees and warranties in each bound volume shall be grouped together by trade and properly indexed, and (6), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and

waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- **.1** liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- **.2** failure of the Work to comply with the requirements of the Contract Documents; or
- **.3** terms of special warranties required by the Contract Documents.

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

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

- **.1** employees on the Work and other persons who may be affected thereby;
- **.2** the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- **.3** other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including installing fencing, posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities. The Contractor shall also be responsible, at the Contractor's sole cost and expense, for all measures necessary to protect any property or improvements within or adjacent to the Project. Any damage to such property or improvements shall be promptly repaired by the Contractor.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.2.9 Without limiting any other requirement of this Section 10.2, the Contractor shall, at its sole cost and expense, promptly repair any unintended damage or disturbance to walls, utilities, sidewalks, curbs, and the property of third parties (including utility companies and governments) resulting from the performance of the Work, whether caused by the Contractor or by its Subcontractors at any tier. The Contractor shall maintain streets in good repair and traversable condition.

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from ~~a~~ such hazardous material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered ~~harmless,~~ harmless due to the negligence of the Owner, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to

injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- **.1** Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- **.2** Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- **.3** Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- **.4** Claims for damages insured by usual personal injury liability coverage;
- **.5** Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- **.6** Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- **.7** Claims for bodily injury or property damage arising out of completed ~~operations;~~ operations, which coverage shall be maintained for no less than four (4) years after final payment; and
- **.8** Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 ~~Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An~~

~~additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.~~

§ 11.1.3.1 The Contractor hereby agrees to deliver to the Owner, within ten (10) days of the date of the Owner-Contractor Agreement and prior to bringing any equipment or personnel onto the site of the Work or the Project site, certified copies of all insurance policies procured by the Contractor under or pursuant to this Section 11.1 or, with consent of the Owner, Certificates of Insurance in form and substance satisfactory to the Owner evidencing the required coverages with limits not less than those specified in Article 8 of the Agreement. The coverage afforded under any insurance policy obtained under or pursuant to this Section 11.1 shall be primary to any valid and collectible insurance carried separately by any of the Indemnitees. The Contractor shall provide written notification to the Owner of the cancellation or expiration of any insurance required by Section 11.1. The Contractor shall provide such written notice within five (5) business days of the date the Contractor is first aware of the cancellation or expiration, or is first aware that the cancellation or expiration is threatened or otherwise may occur, whichever comes first.

§ 11.1.3.2 In no event shall any failure of the Owner to receive certified copies or certificates of policies required under Section 11.1 or to demand receipt of such certified copies or certificates prior to the Contractor's commencing the Work be construed as a waiver by the Owner or the Architect of the Contractor's obligations to obtain insurance pursuant to this Article 11. The obligation to procure and maintain any insurance required by this Article 11 is a separate responsibility of the Contractor and independent of the duty to furnish a certified copy or certificate of such insurance policies.

§ 11.1.3.3 If the Contractor fails to purchase and maintain, or require to be purchased and maintained, any insurance required under this Section 11.1, the Owner may, but shall not be obligated to, upon five (5) days' written notice to the Contractor, purchase such insurance on behalf of the Contractor and shall be entitled to be reimbursed by the Contractor upon demand.

§ 11.1.3.4 When any required insurance, due to the attainment of a normal expiration date or renewal date, shall expire, the Contractor shall supply the Owner with Certificates of Insurance and amendatory riders or endorsements that clearly evidence the continuation of all coverage in the same manner, limits of protection, and scope of coverage as was provided by the previous policy. In the event any renewal or replacement policy, for whatever reason obtained or required, is written by a carrier other than that with whom the coverage was previously placed, or the subsequent policy differs in any way from the previous policy, the Contractor shall also furnish the Owner with a certified copy of the renewal or replacement policy unless the Owner provides the Contractor with prior written consent to submit only a Certificate of Insurance for any such policy. All renewal and replacement policies shall be in form and substance satisfactory to the Owner and written by carriers acceptable to the Owner.

§ 11.1.3.5 Any aggregate limit under the Contractor's liability insurance shall, by endorsement, apply to this Project separately.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims ~~caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.~~made under the Contractor's completed operations coverage. The Contractor shall also cause each Subcontractor to (i) procure insurance reasonably satisfactory to the Owner and (ii) name the Indemnitees as additional insureds under the Subcontractor's comprehensive general liability policy. The additional insured endorsement included on the Subcontractor's comprehensive general liability policy shall state that coverage is afforded the additional insureds with respect to claims arising out of operations performed by or on behalf of the Contractor. If the additional insureds have other insurance that is applicable to the loss, such other insurance shall be on an excess or contingent basis. The amount of the insurer's liability under this insurance policy shall not be reduced by the existence of such other insurance.

§ 11.2 OWNER'S LIABILITY INSURANCE

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 PROPERTY INSURANCE

§ 11.3.1 ~~Unless otherwise provided, the Owner~~ The Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss. The Contractor shall make separate arrangements for any insurance it may require on such construction equipment, and any policy obtained shall include a waiver of subrogation in accordance with the requirements of Section 11.3.7.

~~**§ 11.3.1.2** If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.~~

~~**§ 11.3.1.3** If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.~~

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 BOILER AND MACHINERY INSURANCE

The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 LOSS OF USE INSURANCE

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

~~**§ 11.3.4** If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.~~

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

~~**§ 11.3.6** Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.~~

§ 11.3.6 Evidence of the above coverage issued by a company satisfactory to the District shall be provided to the District by way of Certificate of Insurance before any work commences. A 30 day notice of cancellation or material change in coverage clause shall be included. It is the Contractor's obligation to provide 30 days notice if not done so by Contractor's insurance company. Failure to maintain the proper insurance shall be grounds for immediate termination of this Agreement.

§ 11.3.7 WAIVERS OF SUBROGATION

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent ~~covered by~~ of actual recovery of any insurance proceeds under any property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the ~~Owner~~ Contractor as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the ~~Owner's~~ Contractor's property insurance shall be adjusted by the ~~Owner~~ Contractor as fiduciary and made payable to the Contractor and Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

~~**§ 11.3.9** If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.~~

§ 11.3.10 The ~~Owner as fiduciary~~ Contractor in good faith shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the ~~Owner's~~

Contractor's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the ~~Owner~~ Contractor as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract. Except as otherwise required by statute, the form and substance of such bonds shall be satisfactory to the Owner in the Owner's sole judgment.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense. If prior to the date of Substantial Completion the Contractor, a Subcontractor, or anyone for whom either is responsible uses or damages any portion of the Work, including, without limitation, mechanical, electrical, plumbing, and other building systems, machinery, equipment, or other mechanical device, the Contractor shall cause such item to be restored to "like new" condition at no expense to the Owner. In addition, the Contractor shall promptly remedy damage and loss arising in conjunction with the Project caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or anyone for whose acts they may be liable and for which the Contractor is responsible.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the ~~Contractor and to make a claim for breach of warranty.~~ Contractor. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 ~~The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.~~Upon completion of any Work under or pursuant to this Section 12.2, the one (1) year correction period in connection with the Work requiring correction shall be renewed and recommence. The obligations under Section 12.2 shall cover any repairs and replacement to any part of the Work or other property that is damaged by the defective Work.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section ~~13.2.2,~~ 13.2.2 or elsewhere in the Contract Documents, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 WRITTEN NOTICE

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 ~~Duties~~ Except as expressly provided in the Contract Documents, duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 INTEREST

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.7 TIME LIMITS ON CLAIMS

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable ~~law, but in any case not more than 10 years after the date of Substantial Completion of the Work.~~ law. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

§ 13.8 GENERAL PROVISIONS

§ 13.8.1 All personal pronouns used in this Contract, whether used in the masculine, feminine, or neuter gender, shall include all other genders; and the singular shall include the plural and vice versa. Titles of articles, sections, and subsections are for convenience only and neither limit nor amplify the provisions of this Contract. The use herein of the word "including," when following any general statement, term, or matter, shall not be construed to limit such statement, term, or matter to the specific items or matters set forth immediately following such word or to similar items or matters, whether or not non-limiting language (such words as "without limitation," or "but not limited to," or words of similar import) is used with reference thereto, but rather shall be deemed to refer to all other items or matters that could reasonably fall within the broadest possible scope of such general statement, term, or matter.

§ 13.8.2 Wherever possible, each provision of this Agreement shall be interpreted in a manner as to be effective and valid under applicable law. If, however, any provision of this Agreement, or portion thereof, is prohibited by law or found invalid under any law, only such provision or portion thereof shall be ineffective, without in any manner invalidating or affecting the remaining provisions of this Agreement or valid portions of such provision, which are hereby deemed severable.

§ 13.8.3 Each party hereto agrees to do all acts and things and to make, execute and deliver such written instruments, as shall from time to time be reasonably required to carry out the terms and provisions of the Contract Documents.

§ 13.8.4 Any specific requirement in this Contract that the responsibilities or obligations of the Contractor also apply to a Subcontractor is added for emphasis and is also hereby deemed to include a Subcontractor of any tier. The omission of a reference to a Subcontractor in connection with any of the Contractor's responsibilities or obligations shall not be construed to diminish, abrogate, or limit any responsibilities or obligations of a Subcontractor of any tier under the Contract Documents or the applicable subcontract.

§ 13.9 NO ORAL WAIVER

The provisions of the Contract Document shall not be changed, amended, waived, or otherwise modified in any respect except by a writing signed by Owner. No person is authorized on behalf of Owner to orally change, amend, waive, or otherwise modify the terms of the Contract Documents or any of the Contractor's duties or obligations under or arising out of the Contract Documents. Any change, waiver, approval, or consent granted to the Contractor shall be limited to the specific matters stated in the writing signed by Owner, and shall not relieve Contractor of any other of the duties and obligations under the Contract Documents. No "constructive" changes shall be allowed.

§ 13.10 NOTICES REGARDING LIENS

Contractor shall provide all notices required or permitted by Oregon law for protection of Owner from liens and claims of lien if permitted or required by applicable law. Contractor shall be responsible for filing in the appropriate court or other governmental office records all such notices as required or permitted by the laws of Oregon. Contractor shall provide Owner with copies of all notices received by Contractor from subcontractors, sub-subcontractors, and/or suppliers to Contractor.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped; or

.2 An act of government, such as a declaration of national emergency that requires all Work to be ~~stopped;~~

~~**.3** Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or~~

~~**.4** The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.~~stopped.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor

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

§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- **.1** Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- **.2** Accept assignment of subcontracts pursuant to Section 5.4; and
- **.3** Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- **.1** that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
- **.2** that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- **.1** cease operations as directed by the Owner in the notice;
- **.2** take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 ~~In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.~~Upon such termination, the Contractor shall recover as its sole remedy payment for Work properly performed in connection with the terminated portion of the Work prior to the effective date of termination and for items properly and timely fabricated off the Project site delivered and stored in accordance with the Owner's instructions. The Contractor hereby waives and forfeits all other claims for payment and damages, including, without limitation, anticipated profits. The Owner shall be credited for (i) payments previously made to the Contractor for the terminated portion of the Work, (ii) claims that the Owner has against the Contractor under the Contract, and (iii) the value of the materials, supplies, equipment, or other items that are to be disposed of by the Contractor that are part of the Contract Sum.

§ 14.4.4 The Owner may terminate a portion of the Work for the Owner's convenience and without cause, in which case the provisions of this Section 14.4 shall apply only to the portion of the Work terminated and the Contractor shall continue with performance of the remaining Work that is not terminated.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision ~~Maker.~~ Maker; provided, however, that the claimant shall use its best efforts to furnish the Initial Decision Maker and the other party, as expeditiously as possible, with notice of any Claim including, without limitation, those in connection with concealed or unknown conditions, once such claim is recognized, and shall cooperate with the Architect and the party against whom the claim is made in any effort to mitigate the alleged or potential damages, delay, or other adverse consequences arising out of the condition that is the cause of such a Claim. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 INITIAL DECISION

§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, ~~an initial decision~~ a decision by the Initial Decision Maker shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.2.9 The decision of the Initial Decision Maker in response to a Claim shall not be a condition precedent to mediation and binding dispute resolution in the event (1) the positions of the Initial Decision Maker and Architect are vacant, or (2) the Claim relates to a construction lien.

§ 15.3 MEDIATION

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof. In no event shall any mediator in connection with a Claim be permitted to serve as an arbitrator for that, or any other, Claim that is not resolved pursuant to mediation.

§ 15.4 ARBITRATION

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by ~~the American Arbitration Association in accordance with its Construction Industry Arbitration~~ Arbitration Services of Portland ("ASP") in accordance with the ASP Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. ~~The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.~~ Exclusive venue for arbitration hearings shall be in Lane County, Oregon.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 CONSOLIDATION OR JOINDER

§ 15.4.4.1 ~~Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).~~ The Contractor and Owner waive all objections to joinder of the Contractor or Owner as a party to any Project-related mediation, arbitration or litigation in which either the Contractor or Owner is joined or is otherwise positioned as a party in which the Contractor's conduct or its performance is the source of the dispute.

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, Gregory Brokaw, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 19:07:58 ET on 09/07/2020 under Order No. 9745482038 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A201™ – 2007, General Conditions of the Contract for Construction, as published by the AIA in its software, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

_____

(Signed)

_____

(Title)

_____

(Dated)

SECTION 01 1000
SUMMARY

PART 1 GENERAL

1.01 PROJECT INFORMATION

A. Project: 4J Churchill HS Wood Shop.
B. CIP Project # 464.678.060.
C. Owner: Eugene School District 4J.
D. Architect: Rowell Brokaw Architects, PC.
E. The Project consists of the interior alteration of a STEM classroom/lab into a teaching wood shop at Churchill High School..

1.02 DESCRIPTION OF ALTERATIONS WORK

A. Scope of demolition and removal work is indicated on drawings and specified in Section 02 4100 - Demolition.
B. Plumbing: Alter existing system and add new construction, keeping existing in operation.
C. HVAC: Alter existing system and add new construction, keeping existing in operation.
D. Electrical Power and Lighting: Alter existing system and add new construction, keeping existing in operation.
E. Owner will remove the following items before start of work:
   1. Shop equipment and furnishings..

1.03 WORK BY OWNER

A. (OFOI) Owner Furnished, Owner Installed. Owner will supply and install the following:
   1. Shop equipment.

1.04 CONTRACTOR USE OF SITE AND PREMISES

A. Construction Operations: Limited to areas noted on Drawings for Package 1 work.
B. Arrange use of site and premises to allow:
   1. Owner occupancy.
   2. Work by Others.
   3. Work by Owner.
   4. Use of site and premises by the public.
C. Provide access to and from site as required by law and by Owner:
   1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
   2. Do not obstruct roadways, sidewalks, or other public ways without permit.
D. Construction Parking, Construction Staging, Construction Operations: Refer to Drawings.
E. Utility Outages and Shutdown:
   1. Limit disruption of utility services to hours the building is unoccupied.
   2. Do not disrupt or shut down life safety systems of the occupied portion of the building, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Owner and authorities having jurisdiction.
   3. Prevent accidental disruption of utility services to other facilities.

1.05 WORK SEQUENCE

A. **Coordinate construction schedule and operations with Owner.**
B. **Do not commence Work until after the execution of Agreement and receipt of Notice-to-Proceed from Owner.**
C. **Perform portions of work so that Substantial Completion occurs no later than 12/23/20.**

D. **Achieve Final Completion no later than 1/4/21.**
E. **Owner occupancy of the building:**
   1. **The existing building will be available for construction within five days after notice to proceed.**
   2. **Owner intends to occupy the space on 1/5/21.**

1.06 **MISCELLANEOUS PROVISIONS**

A. Drug and Alcohol Policy:
   1. The possession, use, or distribution of illicit drugs and alcohol on school premises is prohibited. Prescription medications brought to the project site shall be in the original container bearing the name of the drug, the name of the physician and the prescribed dosage.
B. Use of Tobacco Products:
   1. Smoking and the other use of tobacco products is prohibited on all school district property pursuant to OAR 581-021-0110.
C. Safety Requirements:
   1. Safety must not be sacrificed for the sake of productivity or expedience. Safety of students, staff, and the public is critical. Take all reasonable precautions to prevent endangerment or injury. Advise and coordinate operations with the school office.
   2. All contractors who perform work on District property, and their employees, are expected to know the District's expectations for safe work and to adhere to those expectations.
   3. Contractors are to adhere to the regulations of Oregon OSHA for all projects within the School District.
D. General Safe Work Practices:
   1. Students, public and school staff shall not be put at risk by the activities of contractors or their employees.
   2. Safe vehicle operation rules are to be followed at all times. These include positioning vehicles to minimize the necessity of backing and providing a "spotter", someone who will make sure that people do not run into the path of a vehicle when driving on a playground or field that is occupied by students.
   3. Tools shall never be left out when an unsecured work area is vacated.
   4. Ladders and scaffolding will be taken down when an unsecured work area is vacated.
   5. Open holes and other tripping hazards shall be fenced or barricaded when an unsecured work area is vacated.
   6. 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.
   7. "Secured Work Area" is defined as an area having a perimeter cyclone fence at least 6 feet in height, with gates which close and lock so that no casual entrance is possible by unauthorized adults or children.
   8. Contractor to follow all OR-OSHA rules for Confined Spaces, where applicable.
E. Communications Regarding Unsafe Practices:
   1. Upon perceiving a problem, the District will immediately communicate the concern to the Contractor or Contractor's representative on the work site.
   2. If agreement on correction of unsafe conditions cannot be reached, the concerns of the District shall prevail and safety concerns shall be addressed in accordance with the District requirements.
F. Electrical Panels - Lockout/Tagout:
   1. Contractor shall implement a Lockout/Tag-out program for his employees who take equipment out of service or place equipment back into service. Contractor shall review the District’s Energy Control Program prior to commencing work. Rules applying to this

procedure are Oregon Occupational Safety and Health Code OAR 437, Division 2, Subdivision J, General Environmental Controls Lockout/Tag-out (1919.147), or latest edition.

G. Arc Flash - Electrical Safety:
   1. Comply with NFPA 70E (Electrical Safety in the Workplace), current edition. Contractor shall comply with Oregon OSHA 1910.137 (Personal Protective Equipment). Review with the School District Project Manager the 'Eugene School District Electrical Safety Program' before any work commences. Comply with all 'Arc Flash' and 'Electrical Safety' protocols referenced in any and all NFPA, OSHA, OROSHA, NEC, NESC, UL, IBC, IFC and ANSI documents (current editions).

H. Potentially Hazardous Products (Existing Building):
   1. The District attempts to maintain a safe and healthy environment for students and staff. The Contractor is therefore required to follow District guidelines controlling the use of potentially hazardous products and to use these products in a safe manner. Guidelines include the use of materials (adhesives, coatings, carpeting, etc.) which are known to emit little or no airborne pollutants.
   2. MSDS information is required for all potentially hazardous products. The Project Manager and a District Safety Specialist will review these and determine what, if any, mitigation procedures will be required.
   3. Contractor is to maintain and post copies of all MSDS information at the project site and adhere to the required controls.
   4. Contractor is to ensure that work area by students and teachers is restricted. The District will provide signage appropriate for this purpose. The Contractor is to construct and maintain appropriate barriers. This shall include provision of physical separation barriers between “construction” and “occupied” spaces.
   5. Contractor to adopt means of maintaining the construction space in negative air pressure in relation to occupied spaces.
   6. Where there is a new or existing ventilation system in an affected space, the system shall be adjusted to provide the maximum amount of outside air possible with the system.
   7. Efforts shall be made to install and operate new ventilation systems as soon in the construction process as practical.

I. Asbestos Containing Materials Warning:
   1. Asbestos containing materials are known to exist in areas of the Work. The Contractor shall not, in any way, disturb materials which are known to contain asbestos, assumed to contain asbestos, or otherwise have not been tested and confirmed to be asbestos free.
   2. Where access to concealed spaces is required, or it is necessary to disturb building materials such as for drilling of holes, cutting, etc., notify the Owner so that proper investigation and/or removal procedures are followed.
   3. Prior to commencing Work, the Contractor shall meet with the District Safety Specialist and review the Owner’s Asbestos Management Plan for the locations of asbestos-containing materials and/or materials assumed to contain asbestos. After reviewing the Owner’s Asbestos Management Plan, the Contractor is required to sign Form 01 10 00A, Asbestos-containing Materials Notification Statement, provided at the end of this Section.
   4. Contractor must not install any asbestos-containing materials when performing the Work of this project. At the completion of the Work, Contractor will be required to furnish a statement stating that no asbestos-containing materials were installed during the course of the Work. Refer to Sample Form 01 10 00 B at the end of this Section.

J. Full Time Superintendent Disclosure Statement
   1. Prior to or in conjunction with the Preconstruction Conference, the Contractor shall submit the disclosure statement which identifies the Full Time Superintendent for this Project. The

form for this statement, Form 01 10 00C, is provided at the end of this Section.

K. Unsupervised Contact with Students.
   1. As required by ORS 326.603, Contractor shall ensure that Contractor, its officers, employees, agents and any subcontractors will have no unsupervised contact with students while on District property. "Unsupervised contact" with students is defined as contact that provides the person opportunity and probablility for personal communication or touch with students when not under direct District supervision. Contractor shall work with District to ensure compliance with this requirement. If Contractor is unable to ensure through a security plan that none of its officers, employees, or agents or those of its subcontractors will have unsupervised contact with students, then Contractor shall notify District to obtain information about Contractor and its history and to conduct a criminal background check, including fingerprinting, of any Contractor officers, employees, or agents who may have unsurpervised contact with students. Contractor shall cause its employees and/or subcontractors, if any, to authorize District to conduct these background checks. Contractor shall pay all costs for labor and fees assessed for obtaining and processing the background check(s).

L. Background Checks
   1. The procedure for the background checks is as follows:
      a. Log onto the 4J Volunteer Web Page: https://www.helpcounterweb.com/apply.php?district=eugene
      b. In Section 1 - "Tell us about yourself", fill out the requested infromation. When doing so, type "Construction Contractor at ATA" in the box labeled "Skills, Hobbies, Comments, Questions?"
      c. If employee does not have a driver's license number to enter in the appropriate box, leave the box for the license number empty, but select "Oregon" for the state.
      d. In part 3 of the form, select "Eugene District Office".
      e. In part 4 of the form, select "Other".

M. Photo Identification
   1. Any woker that enters the occupied portion of the building when students are present shall wear District-provided photo ID at all times. The photo ID will be worn where it is clearly visible.
   2. If the Contractor's employee clears the volunteer background check, they can obtain Photo Identification from the District. With the photo ID, the worker may enter the occupied building to work, pending results from the fingerprint-based background check.
   3. The procedure to acquire phot identification is as follows:
      a. Contractor shall make an appointment with the District (541-790-7400), between the hours of 7:30 and 3:00, Monday through Friday.
      b. The appointment shall be made at least 24 hours in advance of the appointment.
      c. Contractor's workers to receive the photo ID will present themselves for photos within 15 miniutes of the arranged time for the appointment, at 715 W. 4th, Eugene, OR. (We will try to accommodate early/late arrivals, but it may not be possible.). Photo ID will be issued at the time of the appointment. The process takes about 15 minutes. ID shall be returned to the District at the end of the project, as part of the contract closeout requirements.
      d. The District will provide the photo identification at the District's expense, but the cost of the associated labor for the worker's time to acquire the ID from the District shall be at the Contractor's expense.
      e. For information about fees for the background check procedure, contact Ashly Hoffman at Hoffman_A@4J.lane.edu.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

Form 01 1100A

ASBESTOS-CONTAINING MATERIALS NOTIFICATION STATEMENT FOR CONTRACTORS

This form must be completed and signed by the Contractor prior to beginning work in any Eugene School District 4J building.

The presence of known and assumed asbestos containing materials is documented in the AHERA Management Plan for each building. Copies of the AHERA Management Plan are available in the main office of each building and in the Facilities Management Office at 715 West Fourth Avenue, Eugene, Oregon. The District Asbestos Specialist must be informed of the Contractor's activities in each building prior to the start of work so that the Contractor can be informed on how to use the AHERA Management Plan and to determine if any asbestos-containing materials are likely to be impacted by the work of the Contractor.

The Contractor is responsible for notifying all employees and subcontractors of the presence of asbestos in the building. The Contractor shall not disturb known or assumed asbestos-containing materials. If the Contractor discovers suspected asbestos-containing materials that have not been identified, the Contractor must stop any work impacting the suspected materials and notify the District Asbestos Specialist so that the material can be sampled. Any asbestos-containing materials that must be removed to allow the Contractor to complete the Contractor's work will be removed by the District under separate contract. If the Contractor disturbs asbestos-containing materials, the Contractor will be responsible for the cost of the cleanup and decontamination..

I _____, Representing _____,
(Print Name of Representative) (Business Name)

have been notified of the location of the AHERA Management Plan and agree to avoid impacting all known or assumed asbestos-containing materials in the performance of the Work.

_____ _____
Signature of Representative Date

4j Churchill High School_____ 464.678.060_____
Work Site CIP #

Form 01 11 00B

The Environmental Protection Agency (AHERA) rules require the School District obtain a signed statement from the Site Superintendent that, to the best of his/her knowledge, no asbestos-containing building materials were installed during the Work. Therefore, the following statement must be submitted on the Contractors letterhead prior to Project Closeout.

SAMPLE FORM

(To be submitted on the Contractor's letterhead)

ASBESTOS-CONTAINING MATERIALS STATEMENT

EUGENE SCHOOL DISTRICT 4J

4j Churchill High School Wood Shop Remodel - CIP # 464.678.060

(Name of Project and CIP Number)

We the undersigned, (Name of Company), hereby warrant that to the best of our knowledge all materials furnished for the above referenced project contain 0% asbestos.

_____

(Name of Construction Company)

_____

(Signature and Date)

_____

Printed Name

_____

Job Title

Form 01 11 00 C

FULL TIME SUPERINTENDENT DISCLOSURE STATEMENT

Prior to or in conjunction with the Preconstruction Conference, the Contractor shall submit this disclosure statement which identifies the Full Time Superintendent for this Project.

Project Title: Churchill High School Wood Shop Remodel
Eugene School District 4J
Eugene, Oregon
CIP No. 464.678.060

CONTRACTOR INFORMATION

Company Name: _____

Company Address: _____

City, State, Zip: _____

List below the name, address, telephone, cellular phone FAX numbers and e-mail address (if available) for the full time Superintendent for this Project:

Superintendent's Name: _____

Address: _____
(if different from Contractor's)

_____

I

Phone: _____ Fax: _____
Cell: _____ e-mail _____

The undersigned acknowledges that this project requires and will provide a full-time superintendent throughout this project.

Signature: _____
Authorized Signature

Printed Name: _____

Title: _____

Signature Notarized by:

Subscribed and sworn before me this _____ day of _____, 20__.

Notary Public: _____
Signature

My commission expires: _____

SECTION 01 2000
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedures for preparation and submittal of applications for progress payments.
B. Documentation of changes in Contract Sum and Contract Time.
C. Change procedures.
D. Correlation of Contractor submittals based on changes.
E. Procedures for preparation and submittal of application for final payment.

1.02 RELATED REQUIREMENTS

A. Section 00 5200 - Agreement Form: Contract Sum, retainages, payment period, monetary values of unit prices.

1.03 SCHEDULE OF VALUES

A. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.
   1. Form shall be substantially similar to AIA G702 & G703.
   2. Forms filled out by hand will not be accepted.
B. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.
C. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification section. Identify site mobilization.
D. Provide breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports:
   1. Large Subcontract amounts, where appropriate.
   2. Cost of materials, for each phase of completion, and for total installed value of that part of the work.
   3. Where appliations for payment will include materials purchased, equipment purchased, fabriated and stored items, itemize these as separate line item.
      a. Distinguish between on-site storage and off-site storage.
   4. Round to nearest dollar, total shall equal contract sum.
E. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.
F. Revise schedule to list approved Change Orders, with each Application For Payment.

1.04 APPLICATIONS FOR PROGRESS PAYMENTS

A. Payment Period: Submit at intervals stipulated in the Agreement.
B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
   1. Form shall be substantially similar to AIA G702 & G703.
   2. Forms filled out by hand will not be accepted.
C. For each item, provide a column for listing each of the following:
   1. Item Number.
   2. Description of work.
   3. Scheduled Values.
   4. Previous Applications.
   5. Work in Place and Stored Materials under this Application.
   6. Authorized Change Orders.

7. Total Completed and Stored to Date of Application.
8. Percentage of Completion.
9. Balance to Finish.
10. Retainage.

D. Execute certification by signature of authorized officer.
E. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
F. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.
G. Include the following with the application:
   1. Transmittal letter as specified for submittals in Section 01 3000.
   2. Construction progress schedule, revised and current as specified in Section 01 3000.
   3. Partial release of liens from major subcontractors and vendors.
   4. Affidavits attesting to off-site stored products.
H. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.05 **MODIFICATION PROCEDURES**

A. Architect's Supplemental Instructions (ASI): For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor.
B. Change Request/Proceed Order: The Architect or Owner may issue a Change Request/Proceed Order on form included in this Section. This form is in two parts: The Change Request, and The Proceed Order.
   1. The Change Request is the complete description of change in the Work. It also designates the method to determine the change in the Contract Sum or Contract Time.
      a. Change Requests issued by the Architect are for information only. Do not consider them instructions either to stop work in progress or to exectute the proposed change.
      b. Within the time specified in the Change Request, submit a quotation existimating the change to the Contract Sum and the Contract Time. Include the follwing:
         1) Complete cost breakdown, list of quantities, products required, and cost credits. If requested furnish survey data to substantiate quantities.
         2) Itemize applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
         3) Include labor costs, supervision, overhead, and profit directly attributable to the change.
         4) Include an updated Contractor's Construction Schedule that indicates the effect of the change, including but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
   2. The Proceed Order, when signed by the Owner, instructs Contractor to proceed with the change in the Work, and for subsequent inclusion in a Change Order.
      a. Documentation: Maintain detailed records on a time and materials basis of work required by the Proceed Order. After completion of the change Work, submit an itemized account and supporting data necessary to substantiate inclusion in a Change Order.
   3. Contractor-Intiated Change Request: If latent or unforeseen conditions require modification to the Contract, Contractor may propose changes by submitting a request for a change to the Architect.

a. Changes requested by the Contractor will be authorized only by signature of the Owner on the Change Request/Proceed Order. Do not proceed without this authorization.
b. Include a statement outlining reasons for the change and the effect of th change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on teh Contract Sum and the Contrac Time.
c. Submit a quotation existimating the change to the Contract Sum and the Contract Time. Include the follwing:
    1) Complete cost breakdown, list of quantities, products required, and cost credits. If requested furnish survey data to substantiate quantities.
    2) Itemize applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    3) Include labor costs, supervision, overhead, and profit directly attributable to the change.
    4) Include an updated Contractor's Construction Schedule that indicates the effect of the change, including but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
    5) Comply with requirements of Section 01 6000 - Products, if the proposed change requires substition of a product or the addition of a product.

1.06 **CHANGE ORDER PROCEDURES**

A. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
    1. At intervals determined, no less than monthly, the Architect will collect Change Request/Proceed Orders and issue a Change Order for signatures on an AIA G701.
B. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
C. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
D. Promptly enter changes in Project Record Documents.

1.07 **APPLICATION FOR PAYMENT AT SUBSTANTIAL COMPLETION**

A. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
    1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
    2. This application shall reflect Certificates of Partial Completion issued previously for Owner occupancy of designated portions of the Work.

1.08 **APPLICATION FOR FINAL PAYMENT**

A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
B. Application for Final Payment will not be considered until the following have been accomplished:
    1. All closeout procedures specified in Section 01 7000.
    2. Updated final statement, accounting for final changes to the Contract Sum.
    3. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
    4. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
    5. AIA Document G707, "Consent of Surety to Final Payment."

6. Evidence that claims have been settled.
7. Final, liquidated damages settlement statement.

END OF SECTION

CHANGE REQUEST/PROCEED ORDER

2011-2018 Capital Improvement Program
Eugene School District 4J

CHANGE REQUEST NOTICE

Change Request No.: _____

Project No.: C.I.P. # 464.678.060 Contract No.:_____ Date:_____

Project Title: 4J Churchill High School – Wood Shop Remodel

Contractor:_____

1. **REQUEST INFORMATION**
   Estimated $_____ Time_____ Days_____ Initiated by _____
   Reason for change: _____
   _____

2. **DESCRIPTION**
   Describe changes: _____
   _____
   Describe affected work: _____
   List plan and spec sections: _____
   Describe impacted activities: _____
   Comment: _____

3. **DATES**
   Need for change first known _____ By whom _____
   Contractor first notified _____ How _____
   Owner first notified _____
   Date approved or rejected _____ By whom _____

4. **RECOMMENDATION (cost and time)** _____

PROCEED ORDER

PROCEED ORDER NO.: _____ Date: _____

1. **PAYMENT/COST**
   Actual amount of change $_____ The contract time will be:
   Contractor amount $_____ ( ) increased ( ) decreased by _____ days
   Subcontractor amount $_____ ( ) will remain unchanged
   Type of payment (LS/T&M) _____

2. **MISCELLANEOUS**
   Subcontractors involved: _____
   Major materials: _____
   The cost is not to exceed $_____ Date: _____

3 **CHANGE REQUEST ACCEPTED BY:**
   Contractor: _____ Date: _____
   Architect: _____ Date: _____
   4J CIP Project Manager: _____ Date: _____
   4J CIP Program Manager: _____ Date: _____
   4J Facilities Director: _____ Date: _____

Without the signature of Facilities Director, or the acting Director, this Proceed Order is neither accepted or authorized, except by written authorization of other specific delegation.

SECTION 01 3000
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preconstruction meeting.
B. Site mobilization meeting.
C. Progress meetings.
D. Construction progress schedule.
E. Submittals for review, information, and project closeout.
F. Number of copies of submittals.
G. Submittal procedures.

1.02 PROJECT COORDINATOR

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.
   1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
   2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
   3. Make adequate provisions to accommodate items scheduled for later installation.
   4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
   1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
   1. 1. Preparation of Contractor's Construction Schedule.
   2. 2. Preparation of the Schedule of Values.
   3. 3. Installation and removal of temporary facilities and controls.
   4. 4. Delivery and processing of submittals.
   5. 5. Progress meetings.
   6. 6. Preinstallation conferences.
   7. 7. Project closeout activities.
   8. 8. Startup and adjustment of systems.
   9. 9. Project closeout activities.

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
   1. Salvage materials and equipment involved in performance of, but not actually incorporatedinto, the Work. Refer to other Sections for disposition of salvaged materials

that are designated as Owner's property.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 **ELECTRONIC DOCUMENT SUBMITTALS**

A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF) format and submitted through the established protocols of the General Contractor.
   1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punchlist, and any other document any participant wishes to make part of the project record.
   2. It is Contractor's responsibility to submit documents in allowable format.
   3. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.

3.02 **CITY OF EUGENE EBUILD ELECTRONIC PERMITTING SYSTEM**

A. Contractor shall have a designated person assigned to the project's City of Eugene eBuild account and shall fulfill the requirements of the City of Eugene's permit management system.
   1. Permitted documents, submittals to city, and inspections coordination will be managed by the Contractor through the city's eBuild system.

3.03 **SITE MOBILIZATION MEETING**

A. Owner will schedule meeting at the Project site prior to Contractor occupancy.
B. Attendance Required:
   1. Contractor.
   2. Owner.
   3. Architect.
   4. Special consultants.
   5. Contractor's superintendent.
   6. Major subcontractors.
C. Agenda:
   1. Use of premises by Owner and Contractor.
   2. Owner's requirements.
   3. Construction facilities and controls provided by Owner.
   4. Temporary utilities provided by Owner.
   5. Survey and building layout.
   6. Security and housekeeping procedures.
   7. Schedules.
   8. Application for payment procedures.
   9. Procedures for testing.
   10. Procedures for maintaining record documents.
   11. Requirements for start-up of equipment.
   12. Inspection and acceptance of equipment put into service during construction period.
D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.04 **PROGRESS MEETINGS**

A. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

B. Attendance Required:
   1. Contractor.
   2. Owner.
   3. Architect.
   4. Contractor's superintendent.
   5. Major subcontractors.
C. Agenda:
   1. Review minutes of previous meetings.
   2. Review of work progress.
      a. Contractor's Construction Schedule: Review progress since the last meeting. Provide in a format no larger than 11x17 inches, and discuss a 3-week look-ahead schedule. The look-ahead schedule is required to be directly from the Project Master Schedule and to only show 3 weeks of work. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within Contract Time.
   3. Field observations, problems, and decisions.
   4. Identification of problems that impede, or will impede, planned progress.
   5. Review of submittals schedule and status of submittals.
   6. Review of off-site fabrication and delivery schedules.
   7. Maintenance of progress schedule.
   8. Corrective measures to regain projected schedules.
   9. Planned progress during succeeding work period.
   10. Coordination of projected progress.
   11. Maintenance of quality and work standards.
   12. Effect of proposed changes on progress schedule and coordination.
   13. Other business relating to work.
D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.05 **SUBMITTALS FOR REVIEW**

A. When the following are specified in individual sections, submit them for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.
B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.
C. Samples will be reviewed for aesthetic, color, or finish selection.
D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

3.06 **SUBMITTALS FOR INFORMATION**

A. When the following are specified in individual sections, submit them for information:
   1. Design data.
   2. Certificates.
   3. Test reports.
   4. Inspection reports.
   5. Manufacturer's instructions.

6. Manufacturer's field reports.
7. Delegated Design Submittals.
8. Other types indicated.

B. Submit for Architect's knowledge as contract administrator or for Owner.

3.07 **SUBMITTALS FOR PROJECT CLOSEOUT**

A. Submit Correction Punch List for Substantial Completion.
B. Submit Final Correction Punch List for Substantial Completion.
C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 7800 - Closeout Submittals:
   1. Project record documents.
   2. Delegated Design Submittals.
   3. Operation and maintenance data.
   4. Warranties.
   5. Bonds.
   6. Other types as indicated.
D. Submit for Owner's benefit during and after project completion.

3.08 **NUMBER OF COPIES OF SUBMITTALS**

A. 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.
B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
   1. After review, produce duplicates.
   2. Retained samples will not be returned to Contractor unless specifically so stated.

3.09 **SUBMITTAL PROCEDURES**

A. General Requirements:

END OF SECTION

SECTION 01 3216
CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Construction progress schedule, bar chart type.
B. Construction Schedule Updates.

1.02 SUBMITTALS

A. Within 10 days after date of Agreement, submit preliminary schedule.
B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
    1. Include written certification that major contractors have reviewed and accepted proposed schedule.
D. Within 10 days after joint review, submit complete schedule.
E. Submit updated schedule with each Application for Payment.
F. Submit the number of opaque reproductions that Contractor requires, plus two copies that will be retained by Architect.
G. Submit one reproducible transparency and one opaque reproduction.
H. Submit under transmittal letter form specified in Section 01 3000 - Administrative Requirements.

1.03 QUALITY ASSURANCE

A. Scheduler: Contractor's personnel or specialist Consultant specializing in CPM scheduling with one years minimum experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.
B. Contractor's Administrative Personnel: 3 years minimum experience in using and monitoring CPM schedules on comparable projects.

PART 2 PRODUCTS - NOT USED

2.01 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal Gantt-chart Contractor's Construction Schedule within 10 days of date established for the Notice to Proceed. Base schedule on the Preliminary Construction Schedule and whatever updating and feedback was received since the start of Project. This schedule will be considered the Baseline Project Master Schedule for use throughout the project.
B. Preparation:
    1. Each task to include the following minimum, data field/columns information:
        a. line/task ID or unique number, task name/description, task duration, start date, finish date, predecessor, successor, % complete.
        b. additional data field/columns may be included upon approval of Owner's Project Manager.
    2. All tasks and milestones are to have a text description next to the Gantt bar and are required to show the logic bar ties to predecessor and successor tasks.
    3. Any task with duration longer thatn 10 working days and more than one trade working on the task, needs to be separated into tasks by individual trades.

4. Split the schedule up, at minimum, by floor and sector, unless approved by Owner's Project Manager. Further separation of the schedule for sequencing needs the parent/blanket task description to indicate gridlines and level(s) included. No parent/blanket tasks for multiple levels or sectors unless they have no impact to the critical path and the task description indicates the extent of work included.
5. Show any materials, equipment, contractors and submittals that have the potential to delay construction activities and indicate what work they have potential to impact by logic ties (predecessor and successor relationships).
6. Schedule is to be based on working days with the alotted hours necessary. If overtime is necessary to complete a task then it must be indicated.
7. Schedule must identify which items are on the critical path.
8. Hard copies for distribution are to be no larger than 11x17 format.

PART 3 EXECUTION

3.01 CONTRACTOR'S CONSTRUCTION SCHEDULE UPDATES

A. Contractor's Construction Schedule Updating: The schedule produced in 2.01 is to be used for updating the Project Master Gantt schedule throughout the entire project. At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
   1. The baseline is to be indicated for all tasks tied to the critical path. Any tasks that subsequently become part of the critical path need to indicate the baseline activities also. Any change in critical path needs to be identified and discussed during the weekly project meeting.
   2. Update each task to indicate the actual completion percentage at the time of schedule update, in 5% increments.
   3. Hard copies are to be no larger than 11x17 format.
   4. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
   5. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.

B. Distribution: Distribute copies of approved schedule to Architect, Owner's Project Manager, testing and inspection agencies and other parties identified by the Contractor and owner with a need-to-know schedule responsibility.
   1. Post copies in Project meeting room at the temporary field offices in a large enough format to be able to read the text and see the entire schedule without flipping sheets.

3.02 DISTRIBUTION OF SCHEDULE

A. Distribute copies of updated schedules to Contractor's project site file, to subcontractors, suppliers, Architect, Owner, and other concerned parties.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

END OF SECTION

SECTION 01 3300
DELEGATED DESIGN REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. This Section specifies administrative and procedural requirements for Subcontractor Bidder-Engineered items listed in the various Sections of these Specifications. Sections including Subcontractor-Bidder-Engineered items are as follows:
B. Delegated Design portion of the Work.
   1. Section 07 8400 - Firestopping: Systems Design.
   2. Division 13 - Fire suppression for spray booth
   3. Division 23 - Seismic restraints.
C. Delegated Design submittal procedures.

1.02 RELATED REQUIREMENTS

A. Section 013000 - Administrative Requirements: Submittal procedures, project meetings, progress schedules and documentation, reports, coordination.

1.03 DEFINITIONS

A. Delegated Design: Bidder-Engineered or Professional Design services or certification required of the Contractor in the Specifications.
B. AHJ: Autorities Having Jurisdiction, defined in Section 01 1000 and AIA Document A201.
C. Design Intent: Contract drawings for Delegated Design items are schematic in nature, and are not intended to fully describe the Bidder-Engineered systems, which are the responsibility of the Contractor.

1.04 REQUIREMENTS

A. Where referenced in these specifications, Delegated Design components and their attachments to the structure shall comply with Oregon Structural Specialty Code (OSSC) with local amendments and all applicable local ordinances for Oregon, with parameters as specified in this section.
B. Permitting agency requirements: Follow the requirements for permits current at the time of submission. The General Contractor is responsible to coordinate and submit all material required, so the permitting agency's review will not adversely affect the construction schedule. At or near time of application, the General Contractor shall meet with the permitting agency to identify Subcontractor Bidder-Engineered components and how they are to be submitted and processed for permits.
   1. This project will utilize the City of Eugene online eBuild permitting system. Contractor is required to use this system for submittals, reviews, and coordination as required by the AHJ.
C. Provide complete, integrated, coordinated, operational systems that perform their intended use.
D. Engineer Delegated Design portions for gravity, lateral, and seismic loads.
   1. Load criteria is indicated in Structural Drawings. If not indicated, request criteria.
   2. Indicate reactions to structure.
   3. Provide services of a qualified professional engineer licensed in the project jurisdiction.
E. Calculate and complete engergy forms required by AHJ.
F. Execute the design intent as indicated in Drawings and Specifications.
G. Obtain Permits and inspections, and pay fees required by AHJ.
H. The Owner will not pay for progress delays, additional Work, additional products, restocking, or re-working required by Contractor's failure to coordinate Delegated Design work with other

Project work.

1.05 **SUBMITTALS**

A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Permit Review: Submit Delegated Design documents to AHJ for review and approval.
   1. Copy all communications to Architect.
   2. Comply with AHJ procedures.
   3. Where AHJ requires review by Architect or Architect's consultant, allow 10 working days for Architect's review, allow 15 working days for Architect's consultant review. Submit documents electronically in pdf form. Make corrections noted by Architect and/or Engineer.
   4. Obtain permits prior to executing work component.
   5. Execute corrections to Delegated Design work required by AHJ at no cost to Owner.
      a. Notify Architect immediately of changess required by AHJ.
   6. Include design criteria, design assumptions, structural calculations, fabrication and construction details, required clearances, and interface requirements.
   7. Affix Design Professional's seal for State License required submittals.
C. Engineer's qualifications.
D. Product Data, Shop Drawings and Samples: Comply with requirements in Section 01 3000 for each product of Delegated Design portion of Work. These submittal requirments are in addition to other submittal requirements stated elsewhere in the contract documents.

1.06 **QUALITY ASSURANCE**

A. Documentation: Comply with the following:
   1. Uniform Drawing System, NCS/UDS.
   2. Minimum test size: 3/32 inch.
   3. Legible when scanned or otherwise digitized.
   4. Requirements of AHJ.
   5. PDF format for digital transmission to Owner, Contractor, and Architect.
B. Design requirements specific to Delegated Design portions are indicated in Drawings and in Sections that specify the component.
C. Engineer's Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated.
D. Pre-Submittal Meeting: Contractor shall meet with Architect, Consultant, and Delegated Designer to discuss requirements of Work, submittals, scheduling, and sequencing.

1.07 **SCHEDULING**

A. Schedule design process and submittals required for Delegated Design portions to fit within Construction Schedule.
B. Allow adequate time for AHJ review. Contact AHJ for time estimate and coordination of schedule.
C. If Architect's approval for Shop Drawings is required prior to application for permit, schedule and sequence Shop Drawing review prior to review of permit submittal. Allow for time specified.

END OF SECTION

SECTION 01 3553
SECURITY PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Security measures including entry control and personnel identification.

1.02 RELATED REQUIREMENTS

A. Section 01 1000 - Summary: use of premises, occupancy, and personnel background check and identification.
B. Section 01 5000 - Temporary Facilities and Controls: Temporary lighting.

1.03 ENTRY CONTROL

A. Restrict entrance of persons and vehicles into Project site and existing facilities.
B. Allow entrance only to authorized persons with proper identification.
C. Maintain log of workers and visitors, make available to Owner on request.

1.04 PERSONNEL IDENTIFICATION

A. Provide identification badge to each person authorized to enter premises.
B. Badge To Include: Personal photograph, name, assigned number , expiration date and employer.
C. Maintain a list of accredited persons, submit copy to Owner on request.
D. Require return of badges at expiration of their employment on the Work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 4000
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Submittals.
B. Testing and inspection agencies and services.
C. Control of installation.
D. Tolerances.
E. Defect Assessment.

1.02 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.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.
C. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
    1. Include:
        a. Date issued.
        b. Project title and number.
        c. Name of inspector.
        d. Date and time of sampling or inspection.
        e. Identification of product and specifications section.
        f. Location in the Project.
        g. Type of test/inspection.
        h. Date of test/inspection.
        i. Results of test/inspection.
        j. Compliance with Contract Documents.
        k. When requested by Architect, provide interpretation of results.
    2. Test report submittals are for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.
D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
    1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
    2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.
E. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special

attention, and special environmental criteria required for application or installation.

F. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
   1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.
G. Erection Drawings: Submit drawings for Architect's benefit as contract administrator or for Owner.
   1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.

1.04 **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. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
C. Obtain copies of standards where required by product specification sections.
D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from Contract Documents by mention or inference otherwise in any reference document.

1.05 **TESTING AND INSPECTION AGENCIES AND SERVICES**

A. Owner will employ and pay for services of an independent testing agency to perform specified testing, unless otherwise noted.
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

3.01 **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.

3.02 **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.

3.03 **TESTING AND INSPECTION**

A. See individual specification sections for testing required.
B. Testing Agency Duties:
    1. Test samples of mixes submitted by Contractor.
    2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
    3. Perform specified sampling and testing of products in accordance with specified standards.
    4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
    5. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
    6. Perform additional tests and inspections required by Architect.
    7. Attend preconstruction meetings and progress meetings.
    8. 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-compliance with specified requirements shall be performed by the same agency on instructions by Architect.
F. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

3.04 **DEFECT ASSESSMENT**

A. Replace Work or portions of the Work not complying with specified requirements.

END OF SECTION

SECTION 01 5000
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary utilities.
B. Temporary telecommunications services.
C. Temporary sanitary facilities.
D. Temporary Controls: Barriers, enclosures, and fencing.
E. Security requirements.
F. Vehicular access and parking.
G. Waste removal facilities and services.
H. Project identification sign.
I. Field offices.
J. Temporary heating, cooling and humidity control.

1.02 TEMPORARY UTILITIES

A. Owner will provide the following:
   1. Electrical power and metering, consisting of connection to existing facilities.
   2. Water supply, consisting of connection to existing facilities.
B. New permanent facilities may be used.
C. Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.03 TELECOMMUNICATIONS SERVICES

A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
B. Telecommunications services shall include:
   1. Windows-based personal computer dedicated to project telecommunications, with necessary software and laser printer.
   2. Internet Connections: Minimum of one; Cable modem or faster.
   3. Email: Account/address reserved for project use.

1.04 TEMPORARY SANITARY FACILITIES

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

1.05 BARRIERS

A. 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.
B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
C. Provide protection for plants designated to remain. Replace damaged plants.
D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.
E. Remove temporary measures when no longer required, and restore area to final design.

1.06 FENCING

A. Construction: Commercial grade chain link fence.
B. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.07 **EXTERIOR ENCLOSURES**

A. 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. Provide access doors with self-closing hardware and locks.

1.08 **INTERIOR ENCLOSURES**

A. Provide temporary partitions and ceilings as indicated to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.
B. Construction: Framing and gypsum wall board. Fire taped and painted on Owner occupied side. Seal edges at intersections with existing surfaces:
   1. Maximum flame spread rating of 75 in accordance with ASTM E84.

1.09 **SECURITY**

A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.
B. Coordinate with Owner's security program.

1.10 **VEHICULAR ACCESS AND PARKING**

A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
B. Coordinate access and haul routes with governing authorities and Owner.
C. Provide and maintain access to fire hydrants, free of obstructions.
D. Provide means of removing mud from vehicle wheels before entering streets.
E. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.
F. Provide temporary pedestrian and vehicular access for Owner as indicated on Drawings.
G. Provide installation of temporary bike racks as indicated on Drawings.

1.11 **WASTE REMOVAL**

A. See Section 01 7419 - Construction Waste Management and Disposal, for additional requirements.
B. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
C. Provide containers with lids. Remove trash from site periodically.
D. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.
F. Provide temporary trash enclosures for Owner as indicated on Drawings.
G. Remove temporary measures when no longer required, and restore area to final design.

1.12 **PROJECT IDENTIFICATION**

A. Provide project identification sign of design and construction indicated on drawings.
B. Erect on site at location established by Architect.
C. No other signs are allowed without Owner permission except those required by law.

1.13 **FIELD OFFICES**

A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack, and drawing display table.
B. Provide space for Project meetings, with table and chairs to accommodate 12 persons.
C. Locate offices a minimum distance of 30 feet from existing and new structures.

1.14 **REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS**

A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
C. Clean and repair damage caused by installation or use of temporary work.
D. Restore existing facilities used during construction to original condition.
E. Restore new permanent facilities used during construction to specified condition.

1.15 **TEMPORARY HEATING, COOLING AND HUMIDITY CONTROL**

A. Provide temporary heating, cooling, controls, humidification, dehumidification as required to facilitate the construction of this project. Size and select temporary system based on the requirements of the various trades during construction. This includes, but is not limited to, drywall, casework, wood flooring and wood finishes that are subject to warping. Size and install system to prevent mold growth. Coordinate location of the temporary system.
B. The house system can be used. If the house system is used, develop a procedure for how the house system will be used including a sketch depicting the house system, how filtration will be used to prevent construction debris from entering the system and how often the filters will be changed, how the ductwork will be cleaned after use to insure a clean system is turned over to the Owner and how the units are sized. Submit this procedure to the Architect to review. Follow National Air Duct Cleaners Association (NADCA) duct cleaning procedures and guidelines. Warranties for the house system, if new, to commence when the Owner moves in if the house system is used as the means to maintain the climate within the building during construction. Include this warranty requirement in the original bid. Coordinate and provide any temporary power, controls, ductwork, piping, plumbing anchorage, miscellaneous steel and structural supports required to support the temporary system. Installation of the system to comply with all applicable codes and be acceptable to the Authority Having Jurisdiction (AHJ).

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 6000
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.
B. Transportation, handling, storage and protection.
C. Product option requirements.
D. Substitution limitations.

1.02 RELATED REQUIREMENTS

A. Instructions to Bidders: Product options and substitution procedures prior to bid date.
B. Section 01 4000 - Quality Requirements: Product quality monitoring.
C. Section 01 6116 - VOC Limitations: Requirements for VOC-restricted product categories.
D. Section 01 7419 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting product selection, packaging and substitutions.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS

A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
    1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by Contract Documents.
B. Use of products having any of the following characteristics is not permitted:
    1. Containing lead, cadmium, or asbestos.
C. Where other criteria are met, Contractor shall give preference to products that:
    1. If used on interior, have lower emissions, as defined in Section 01 6116.
    2. If wet-applied, have lower VOC content, as defined in Section 01 6116.
    3. Are extracted, harvested, and/or manufactured closer to the location of the project.
    4. Have longer documented life span under normal use.
    5. Result in less construction waste. See Section 01 7419
    6. Are made of vegetable materials that are rapidly renewable.
    7. Are made of recycled materials.
    8. If made of wood, are made of sustainably harvested wood, wood chips, or wood fiber.
    9. If bio-based, other than wood, are or are made of Sustainable Agriculture Network certified products.
    10. Are Cradle-to-Cradle Certified.
    11. Have a published Environmental Product Declaration (EPD).
    12. Have a published Health Product Declaration (HPD).

13. Have a published Manufacturer's Inventory of Chemical Content.

2.02 **PRODUCT OPTIONS**

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

PART 3 EXECUTION

3.01 **SUBSTITUTION LIMITATIONS**

A. See Section 01 2500 - Substitution Procedures.
B. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.

3.02 **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. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.03 **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. See Section 01 7419.
B. Store and protect products in accordance with manufacturers' instructions.
C. Store with seals and labels intact and legible.
D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
E. For exterior storage of fabricated products, place on sloped supports above ground.
F. Provide off-site storage and protection when site does not permit on-site storage or protection.
G. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
H. Comply with manufacturer's warranty conditions, if any.
I. Do not store products directly on the ground.
J. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
K. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

L. Prevent contact with material that may cause corrosion, discoloration, or staining.
M. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
N. 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 6116
VOC LIMITATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Requirements for Indoor-Emissions-Restricted products.
B. Requirements for VOC-Content-Restricted products.
C. Requirement for installer certification that they did not use any non-compliant products.

1.02 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Submittal procedures.
B. Section 01 4000 - Quality Requirements: Procedures for testing and certifications.
C. Section 01 5719 - Temporary Environmental Controls: Procedures.
D. Section 01 6000 - Product Requirements: Fundamental product requirements, substitutions and product options, delivery, storage, and handling.

1.03 DEFINITIONS

A. Indoor-Emissions-Restricted Products: All products in the following product categories, whether specified or not:
   1. Interior paints and coatings applied on site.
   2. Interior adhesives and sealants applied on site, including flooring adhesives.
   3. Composite wood.
   4. Products making up wall and ceiling assemblies.
   5. Thermal and acoustical insulation.
   6. Other products when specifically stated in the specifications.
B. VOC-Content-Restricted Products: All products in the following product categories, whether specified or not:
   1. Interior paints and coatings applied on site.
   2. Interior adhesives and sealants applied on site, including flooring adhesives.
   3. Other products when specifically stated in the specifications.
C. Interior of Building: Anywhere inside the exterior weather barrier.
D. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.
E. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.
F. Inherently Non-Emitting Materials: Products composed wholly of minerals or metals, unless they include organic-based surface coatings, binders, or sealants; and specifically the following:
   1. Concrete.
   2. Clay brick.
   3. Metals that are plated, anodized, or powder-coated.
   4. Glass.
   5. Ceramics.

1.04 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 D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings 2005 (Reapproved 2013).
C. BIFMA M7.1 - Standard Test Method for Determining VOC Emissions; Business and Institutional Furniture Manufacturers Association 2011.

D. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers; California Department of Public Health v1.1, 2010.
E. CARB (ATCM) - Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products; California Air Resources Board current edition.
F. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board 2007.
G. CHPS (HPPD) - High Performance Products Database Current Edition at www.chps.net/.
H. CRI (GLP) - Green Label Plus Testing Program - Certified Products; www.carpet-rug.org current edition.
I. GreenSeal GS-36 - Commercial Adhesives 2011.
J. SCAQMD 1113 - South Coast Air Quality Management District Rule No.1113 current edition.
K. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168 current edition.
L. SCS (CPD) - SCS Certified Products current listings at www.scscertified.com.
M. UL (GGG) - GREENGUARD Gold Certified Products current listings at http://http://productguide.ulenvironment.com/QuickSearch.aspx.

1.05 **SUBMITTALS**

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.
C. Installer Certifications Regarding Prohibited Content: Require each installer of any type of product (not just the products for which VOC restrictions are specified) to certify that either 1) no adhesives, joint sealants, paints, coatings, or composite wood or agrifiber products have been used in the installation of installer's products, or 2) that such products used comply with these requirements.

1.06 **QUALITY ASSURANCE**

A. Indoor Emissions Standard and Test Method: CAL (CDPH SM), using Standard Private Office exposure scenario and the allowable concentrations specified in the method, and range of total VOC's after 14 days.
    1. Wet-Applied Products: State amount applied in mass per surface area.
    2. Paints and Coatings: Test tinted products, not just tinting bases.
    3. Evidence of Compliance: Acceptable types of evidence are the following;
        a. Current UL (GGG) certification.
        b. Current SCS (CPD) Floorscore certification.
        c. Current SCS (CPD) Indoor Advantage Gold certification.
        d. Current listing in CHPS (HPPD) as a low-emitting product.
        e. Current CRI (GLP) certification.
        f. Test report showing compliance and stating exposure scenario used.
    4. Product data submittal showing VOC content is NOT acceptable evidence.
    5. Manufacturer's certification without test report by independent agency is NOT acceptable evidence.
B. VOC Content Test Method: 40 CFR 59, Subpart D (EPA Method 24), or ASTM D3960, unless otherwise indicated.
    1. Evidence of Compliance: Acceptable types of evidence are:
        a. Report of laboratory testing performed in accordance with requirements.
        b. Published product data showing compliance with requirements.
        c. Certification by manufacturer that product complies with requirements.
C. Composite Wood Emissions Standard: CARB (ATCM) for ultra-low emitting formaldehyde (ULEF) resins.

1. Evidence of Compliance: Acceptable types of evidence are:
    a. Current SCS "No Added Formaldehyde (NAF)" certification; www.scscertified.com.
    b. Report of laboratory testing performed in accordance with requirements.
    c. Published product data showing compliance with requirements.

D. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

PART 2 PRODUCTS

2.01 MATERIALS

A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.

B. Indoor-Emissions-Restricted Products: Comply with Indoor Emissions Standard and Test Method, except for:
    1. Composite Wood, Wood Fiber, and Wood Chip Products: Comply with Composite Wood Emissions Standard or contain no added formaldehyde resins.
    2. Inherently Non-Emitting Materials.

C. VOC-Content-Restricted Products: VOC content not greater than required by the following:
    1. Adhesives, Including Flooring Adhesives: SCAQMD 1168 Rule.
    2. Aerosol Adhesives: GreenSeal GS-36.
    3. Joint Sealants: SCAQMD 1168 Rule.
    4. Paints and Coatings: Each color; most stringent of the following:
        a. 40 CFR 59, Subpart D.
        b. SCAQMD 1113 Rule.
        c. CARB (SCM).

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL

A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.

B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

END OF SECTION

SECTION 01 6116.01

ACCESSORY MATERIAL VOC CONTENT CERTIFICATION FORM

1.01 **PRODUCT CERTIFICATION**

A. I certify that the installation work of my firm on this project:
   1. [HAS] [HAS NOT] required the use of any ADHESIVES.
   2. [HAS] [HAS NOT] required the use of any JOINT SEALANTS.
   3. [HAS] [HAS NOT] required the use of any PAINTS OR COATINGS.
   4. [HAS] [HAS NOT] required the use of any COMPOSITE WOOD or AGRIFIBER PRODUCTS.

B. Product data and MSDS sheets are attached.

2.01 **CERTIFIED BY: (INSTALLER/MANUFACTURER/SUPPLIER FIRM)**

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

END OF SECTION

SECTION 01 7000
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.
B. Requirements for alterations work, including selective demolition.
C. Pre-installation meetings.
D. Cutting and patching.
E. Surveying for laying out the work.
F. Cleaning and protection.
G. Starting of systems and equipment.
H. Demonstration and instruction of Owner personnel.
I. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

1.02 RELATED REQUIREMENTS

A. Section 01 1000 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.
B. Section 01 3000 - Administrative Requirements: Submittals procedures, Electronic document submittal service.
C. Section 01 4000 - Quality Requirements: Testing and inspection procedures.
D. Section 01 7419 - Construction Waste Management and Disposal: Additional procedures for trash/waste removal, recycling, salvage, and reuse.
E. Section 01 7800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.
F. Section 01 7900 - Demonstration and Training: Demonstration of products and systems to be commissioned and where indicated in specific specification sections
G. Section 02 4100 - Demolition: Demolition of whole structures and parts thereof; site utility demolition.
H. Section 07 8400 - Firestopping.

1.03 REFERENCE STANDARDS

A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations 2013.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
   1. On request, submit documentation verifying accuracy of survey work.
   2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in compliance with Contract Documents.
   3. Submit surveys and survey logs for the project record.
C. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
   1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences. Include design drawings and calculations for bracing and shoring.
   2. Identify demolition firm and submit qualifications.
   3. Include a summary of safety procedures.

D. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
   1. Structural integrity of any element of Project.
   2. Integrity of weather exposed or moisture resistant element.
   3. Efficiency, maintenance, or safety of any operational element.
   4. Visual qualities of sight exposed elements.
   5. Work of Owner or separate Contractor.
E. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.05 **QUALIFICATIONS**

A. For surveying work, employ a land surveyor registered in Oregon and acceptable to Architect. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities,
B. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in Oregon. Employ only individual(s) trained and experienced in establishing and maintaining horizontal and vertical control points necessary for laying out construction work on project of similar size, scope and/or complexity.
C. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in Oregon.

1.06 **PROJECT CONDITIONS**

A. Use of explosives is not permitted.
B. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
C. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
D. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
E. Dust Control: 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.
   1. Provide dust-proof enclosures to prevent entry of dust generated outdoors.
   2. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.
F. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
   1. Minimize amount of bare soil exposed at one time.
   2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
   3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
   4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
G. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
   1. At All Times: Excessively noisy tools and operations will not be tolerated inside the building at any time of day; excessively noisy includes jackhammers.
   2. Outdoors: Limit conduct of especially noisy exterior work to the hours of 8 am to 5 pm.
   3. Indoors: Limit conduct of especially noisy interior work to the hours of 6 pm to 7 am.
H. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.
   1. Pest Control Service: Weekly treatments.

I. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.
J. Pollution Control: 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.

1.07 **COORDINATION**

A. See Section 01 1000 for occupancy-related requirements.
B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
C. Notify affected utility companies and comply with their requirements.
D. 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.
E. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated 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.
F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
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.

PART 2 PRODUCTS

2.01 **PATCHING MATERIALS**

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

PART 3 EXECUTION

3.01 **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.

3.02 **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.

3.03 **PREINSTALLATION MEETINGS**

A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
B. Require attendance of parties directly affecting, or affected by, work of the specific section.
C. Notify Architect four days in advance of meeting date.
D. Prepare agenda and preside at meeting:
   1. Review conditions of examination, preparation and installation procedures.
   2. Review coordination with related work.
E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.04 **LAYING OUT THE WORK**

A. Verify locations of survey control points prior to starting work.
B. Promptly notify Architect of any discrepancies discovered.
C. Contractor shall locate and protect survey control and reference points.
D. Control datum for survey is that indicated on drawings.
E. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
F. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
G. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
H. Utilize recognized engineering survey practices.
I. Establish a minimum of two permanent bench marks on site, referenced to established control points. Record locations, with horizontal and vertical data, on project record documents.
J. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
   1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
   2. Grid or axis for structures.
   3. Building foundation, column locations, ground floor elevations.
K. Periodically verify layouts by same means.
L. Maintain a complete and accurate log of control and survey work as it progresses.

3.05 **GENERAL INSTALLATION REQUIREMENTS**

A. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.
B. 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.
C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
F. Make neat transitions between different surfaces, maintaining texture and appearance.

3.06 **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 indicated.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of alterations work constitutes acceptance of existing conditions.

B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
   1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 5000 in locations indicated on drawings.
   2. Provide sound retardant partitions of construction indicated on drawings in locations indicated on drawings.

C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
   1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
   2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.

D. Remove existing work as indicated and as required to accomplish new work.
   1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
   2. Remove items indicated on drawings.
   3. Relocate items indicated on drawings.
   4. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
   5. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.

E. Services (Including but not limited to HVAC, Plumbing, and Electrical): Remove, relocate, and extend existing systems to accommodate new construction.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
   2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
   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.
      a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
      b. See Section 01 1000 for other limitations on outages and required notifications.
      c. Provide temporary connections as required to maintain existing systems in service.
   4. Verify that abandoned services serve only abandoned facilities.
   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; patch holes left by removal using materials specified for new construction.

F. 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.

G. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.
2. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
3. Where a change of plane of 1/4 inch or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.
4. Trim existing wood doors as necessary to clear new floor finish. Refinish trim as required.

H. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.

I. Refinish existing surfaces as indicated:
1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.

J. Clean existing systems and equipment.

K. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.

L. Do not begin new construction in alterations areas before demolition is complete.

M. Comply with all other applicable requirements of this section.

3.07 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. See Alterations article above for additional requirements.

C. 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-complying work.

D. 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.

E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

G. Restore work with new products in accordance with requirements of Contract Documents.

H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.

J. 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.

3.08 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.

3.09 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 coverings if possible.

3.10 SYSTEM STARTUP

A. Coordinate with requirements of Section 01 9113 - General Commissioning Requirements.

B. Coordinate schedule for start-up of various equipment and systems.

C. Notify Architect and Owner seven days prior to start-up of each item.

D. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

E. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

F. Verify that wiring and support components for equipment are complete and tested.

G. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.

H. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

I. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.11 **DEMONSTRATION AND INSTRUCTION**

A. See Section 01 7900 - Demonstration and Training.

3.12 **ADJUSTING**

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

3.13 **FINAL CLEANING**

A. Execute final cleaning prior to final project assessment.
   1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.
B. Use cleaning materials that are nonhazardous.
C. 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.
D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
E. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
F. Clean filters of operating equipment.
G. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.
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.

3.14 **CLOSEOUT PROCEDURES**

A. Make submittals that are required by governing or other authorities.
   1. Provide copies to Architect and Owner.
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. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.
E. Owner will occupy all of the building as specified in Section 01 1000.
F. 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.
G. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
H. Accompany Project Coordinator on Contractor's preliminary final inspection.
I. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.
J. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

END OF SECTION

SECTION 01 7419
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

A. Owner requires that this project generate the least amount of trash and waste possible.
B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
D. Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration:
   1. Aluminum and plastic beverage containers.
   2. Corrugated cardboard.
   3. Wood pallets.
   4. Clean dimensional wood.
   5. Metals, including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
E. Methods of trash/waste disposal that are not acceptable are:
   1. Burning on the project site.
   2. Burying on the project site.
   3. Dumping or burying on other property, public or private.
   4. Other illegal dumping or burying.
   5. Incineration, either on- or off-site.
F. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.02 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.
B. Section 01 5000 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.
C. Section 01 6000 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.
D. Section 01 7000 - Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

1.03 DEFINITIONS

A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.

E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
I. Return: To give back reusable items or unused products to vendors for credit.
J. Reuse: To reuse a construction waste material in some manner on the project site.
K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
N. Toxic: Poisonous to humans either immediately or after a long period of exposure.
O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

PART 3 EXECUTION

2.01 WASTE MANAGEMENT PROCEDURES

A. See Section 01 3000 for additional requirements for project meetings, reports, submittal procedures, and project documentation.
B. See Section 01 5000 for additional requirements related to trash/waste collection and removal facilities and services.
C. See Section 01 6000 for waste prevention requirements related to delivery, storage, and handling.
D. See Section 01 7000 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

2.02 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
B. Instruction: 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.
C. Meetings: Discuss trash/waste management goals and issues at project meetings.
    1. Prebid meeting.
    2. Preconstruction meeting.
    3. Regular job-site meetings.
D. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
    1. As a minimum, provide:
        a. Separate area for storage of materials to be reused on-site, such as wood cut-offs for blocking.
        b. Separate dumpsters for each category of recyclable.
        c. Recycling bins at worker lunch area.

2. Provide containers as required.
3. Provide adequate space for pick-up and delivery and convenience to subcontractors.
4. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.

E. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.

F. 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.

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

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

END OF SECTION

SECTION 01 7800
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

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

1.02 RELATED REQUIREMENTS

A. Section 00 7200 - General Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.
B. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
C. Section 01 7000 - Execution and Closeout Requirements: Contract closeout procedures.
D. Individual Product Sections: Specific requirements for operation and maintenance data.
E. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
B. Operation and Maintenance Data: Provide **sets as defined below along with** an electronic copy.
   1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with 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 one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
   4. Submit **one set** of revised final documents in final form within 10 days after final inspection.
C. 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. Make 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.

PART 3 EXECUTION

2.01 PROJECT RECORD DOCUMENTS

A. Project Record Documents shall be maintained in "real time" using an electronic pdf, such as Bluebeam.
B. In addition, 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.
5. Reviewed shop drawings, product data, and samples.
6. Manufacturer's instruction for assembly, installation, and adjusting.

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 Drawingsand Shop 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.

2.02 **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.

2.03 **OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES**

A. For Each Product, Applied Material, and Finish:
   1. Product data, with catalog number, size, composition, and color and texture designations.
   2. Information for re-ordering custom manufactured products.
B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
C. 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.
D. Additional information as specified in individual product specification sections.
E. 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.

2.04 **OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS**

A. For Each Item of Equipment and Each System:
   1. Description of unit or system, and component parts.
   2. Identify function, normal operating characteristics, and limiting conditions.

3. Include performance curves, with engineering data and tests.
4. Complete nomenclature and model number of replaceable parts.

B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
D. Include color coded wiring diagrams as installed.
E. 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.
F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
G. Provide servicing and lubrication schedule, and list of lubricants required.
H. Include manufacturer's printed operation and maintenance instructions.
I. Include sequence of operation by controls manufacturer.
J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
K. Provide control diagrams by controls manufacturer as installed.
L. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.
M. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
N. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
O. Include test and balancing reports.
P. Additional Requirements: As specified in individual product specification sections.

2.05 **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. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
H. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.
I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
J. Arrangement of Contents: Organize each volume in parts as follows:

1. Project Directory.
2. Table of Contents, of all volumes, and of this volume.
3. Operation and Maintenance Data: Arranged by system, then by product category.
   a. Source data.
   b. Product data, shop drawings, and other submittals.
   c. Operation and maintenance data.
   d. Field quality control data.
   e. Photocopies of warranties and bonds.
4. Design Data: To allow for addition of design data furnished by Architect or others, provide a tab labeled "Design Data" and provide a binder large enough to allow for insertion of at least 20 pages of typed text.

K. Electronic Copy: Provide a single PDF file with bookmarks matching tabbed sections in Binders.

2.06 **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 permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
B. Verify that documents are in proper form, contain full information, and are notarized.
C. Co-execute submittals when required.
D. Retain warranties and bonds until time specified for submittal.
E. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.

END OF SECTION

SECTION 01 7900
DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.01 SUMMARY

A. Demonstration of products and systems where indicated in specific specification sections.
B. Training of Owner personnel in operation and maintenance is required for:
   1. HVAC systems and equipment.
   2. Electrical systems and equipment.
   3. Items specified in individual product Sections.

1.02 RELATED REQUIREMENTS

A. Section 01 7800 - Closeout Submittals: Operation and maintenance manuals.
B. Other Specification Sections: Additional requirements for demonstration and training.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Training Plan: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.
   1. Submit to Architect for transmittal to Owner.
   2. Submit not less than four weeks prior to start of training.
   3. Revise and resubmit until acceptable.
   4. Include at least the following for each training session:
      a. Identification, date, time, and duration.
      b. Description of products and/or systems to be covered.
      c. Name of firm and person conducting training; include qualifications.
      d. Intended audience, such as job description.
      e. Objectives of training and suggested methods of ensuring adequate training.
      f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
      g. Media to be used, such a slides, hand-outs, etc.
      h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.
C. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
   1. Include applicable portion of O&M manuals.
   2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
   3. Provide one extra copy of each training manual to be included with operation and maintenance data.

1.04 QUALITY ASSURANCE

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

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 **DEMONSTRATION - GENERAL**

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

3.02 **TRAINING - GENERAL**

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

END OF SECTION

SECTION 02 4100
DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Selective demolition of building elements for alteration purposes.

1.02 RELATED REQUIREMENTS

A. Section 01 1000 - Summary: Limitations on Contractor's use of site and premises.
B. Section 01 5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
C. Section 01 7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.
D. Section 01 7419 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.

1.03 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.

1.04 SUBMITTALS

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

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with other requirements specified in Section 01 7000.
B. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
    1. Obtain required permits.
    2. Comply with applicable requirements of NFPA 241.
    3. Use of explosives is not permitted.
    4. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
    5. Provide, erect, and maintain temporary barriers and security devices.
    6. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
    7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
    8. Do not close or obstruct roadways or sidewalks without permit.
    9. 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.
    10. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
C. Do not begin removal until receipt of notification to proceed from Owner.

D. Do not begin removal until built elements to be salvaged or relocated have been removed.
E. Do not begin removal until vegetation to be relocated has been removed and specified measures have been taken to protect vegetation to remain.
F. Protect existing structures and other elements that are not to be removed.
   1. Provide bracing and shoring.
   2. Prevent movement or settlement of adjacent structures.
   3. Stop work immediately if adjacent structures appear to be in danger.
G. 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.
H. 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.
I. Perform demolition in a manner that maximizes salvage and recycling of materials.
   1. Comply with requirements of Section 01 7419 - Waste Management.
   2. Dismantle existing construction and separate materials.
   3. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.
J. Partial Removal of Concrete floors: Neatly saw cut at right angle to surface.

3.02 **SELECTIVE DEMOLITION FOR ALTERATIONS**

A. Refer to Section 01 7000 - Execution and Closeout Requirements for general requirements.
B. 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 indicated.
   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.
C. Separate areas in which demolition is being conducted from other areas that are still occupied.
   1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 5000 in locations indicated on drawings.
   2. Provide sound retardant partitions of construction indicated on drawings in locations indicated on drawings.
D. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
E. Remove existing work as indicated and as required to accomplish new work.
   1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
   2. Remove items indicated on drawings.
F. Services (Including but not limited to HVAC, Plumbing, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
   2. 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.
   3. See Section 01 1000 for other limitations on outages and required notifications.
   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.

G. 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.

3.03 **DEBRIS AND WASTE REMOVAL**

A. Remove debris, junk, and trash from site.
B. Remove from site all materials not to be reused on site; comply with requirements of Section 01 7419 - Waste Management.
C. Leave site in clean condition, ready for subsequent work.
D. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 03 3000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete formwork.
B. Concrete reinforcement.
C. Joint devices associated with concrete work.
D. Miscellaneous concrete elements, including equipment pads.
E. Concrete curing.

1.02 REFERENCE STANDARDS

A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete 1991 (Reapproved 2009).
B. ACI 301 - Specifications for Structural Concrete 2010 (Errata 2012).
C. ACI 302.1R - Guide for Concrete Floor and Slab Construction 2004 (Errata 2007).
D. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete 2000.
E. ACI 305R - Hot Weather Concreting 2010.
F. ACI 306R - Cold Weather Concreting 2010.
G. ACI 308R - Guide to Curing Concrete 2001 (Reapproved 2008).
H. ACI 318 - Building Code Requirements for Structural Concrete and Commentary 2011.
I. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement 2015.
J. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete 2012.
K. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2013.
L. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete 2015.
M. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens) 2013.
N. ASTM C150/C150M - Standard Specification for Portland Cement 2015.
O. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete 2007.
P. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete 2013.
Q. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete 2015.
R. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete 2010.
S. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink) 2014.
T. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures 2014.
U. COE CRD-C 513 - COE Specifications for Rubber Waterstops 1974.
V. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation 2013.
W. CPAA - Recommendations for the design, specifications, and placement of concrete slabs (for polished concrete).
X. PCA - Portland Cement Association, document Concrete Information - "Resurfacing Concrete Floors" - 1996.
Y. ASTM C157/C157M - Standard Test for Length Change of Hardened Hydraulic-Cement Mortar and Concrete.

1.03 **SUBMITTALS**

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
C. Mix Design: Submit proposed concrete mix design a minimum of 15 days prior to the start of Work.
   1. Water-cement ratio, slump, and aggregate grading.
   2. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
   3. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.
   4. Indicate materials sources for principal constituents.
   5. Indicate whether mix is appropriate for pumping.
D. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.
E. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.
F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
G. Floor surface flatness and levelness measurements to determine compliance with specified tolerances.

1.04 **QUALITY ASSURANCE**

A. Perform work of this section in accordance with ACI 301 and ACI 318.
   1. Maintain one copy of each document on site.
B. Admixture Technician: Provide for the Work, an ACI Level 2 Concrete Technician, or other acceptable professional certificate holder, with expert knowledge of the specific products and materials in the mix design including, but not limited to, admixtures. The technician shall approve each mix design proposed for the Work, assist in proportioning concrete materials for optimal results, and advise on proper admixture use, potential undesirable and uncontrolled effects and propose mix adjustment to meet project conditions.
C. Follow recommendations of ACI 305R when concreting during hot weather.
D. Follow recommendations of ACI 306R when concreting during cold weather.
E. For slabs required to include moisture vapor reduction admixture (MVRA), do not proceed with placement unless manufacturer's representative is present for every day of placement.

1.05 **WARRANTY**

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

PART 2 PRODUCTS

2.01 **FORMWORK**

A. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
   1. Form Facing for Exposed Finish Concrete: Contractor's choice of materials that will provide smooth, stain-free final appearance.
   2. Earth Cuts: Do not use earth cuts as forms for vertical surfaces. Natural rock formations that maintain a stable vertical edge may be used as side forms.
   3. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
   4. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface.

2.02 **REINFORCEMENT MATERIALS**

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
   1. Type: Deformed billet-steel bars.
   2. Finish: Unfinished, unless otherwise indicated.
B. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch.
   2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
   3. Provide stainless steel, galvanized, plastic, or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.

2.03 **CONCRETE MATERIALS**

A. Cement: ASTM C150, Type I/II - Normal Portland type.
B. Fine and Coarse Aggregates: ASTM C33/C33M.
C. Fly Ash: ASTM C618, Class C or F.
D. Calcined Pozzolan: ASTM C618, Class N.
E. Silica Fume: ASTM C1240, proportioned in accordance with ACI 211.1.
F. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.04 **ADMIXTURES**

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
B. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.
C. High Range Water Reducing Admixture: ASTM C494/C494M Type F.
D. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.
E. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.
   1. Provide pigmented type, with ASTM C979/C979M inorganic pigments.
F. Accelerating Admixture: ASTM C494/C494M Type C.
G. Retarding Admixture: ASTM C494/C494M Type B.
H. Water Reducing Admixture: ASTM C494/C494M Type A.
I. Shrinkage Reducing Admixture: ASTM C494/C494M, Type S.

2.05 **ACCESSORY MATERIALS**

A. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
   1. Grout: Comply with ASTM C1107/C1107M.
   2. Minimum Compressive Strength at 48 Hours, ASTM C109/C109M: 2,000 pounds per square inch.
   3. Minimum Compressive Strength at 28 Days, ASTM C109/C109M: 7,000 pounds per square inch.

2.06 **CURING MATERIALS**

A. Evaporation Reducer: Liquid thin-film-forming compound that reduces rapid moisture loss caused by high temperature, low humidity, and high winds; intended for application immediately after concrete placement.
   1. Manufacturers:
      a. BASF Confilm.
      b. Substitutions: See Section 01 6000 - Product Requirements.
B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
C. Moisture-Retaining Sheet: ASTM C171.

1. Curing paper, regular.
2. Polyethylene film, white opaque, minimum nominal thickness of 4 mil, 0.004 inch.
3. White-burlap-polyethylene sheet, weighing not less than 3.8 ounces per square yard.

D. Water: Potable, not detrimental to concrete.

2.07 **CONCRETE MIX DESIGN**

A. Standard Mix Characteristics: Comply with General Structural Notes and ACI 301.
   1. Proportion constituents in accordance with ACI 211.1 recommendations and as recommended by admixture manufacturers. Unless otherwise indicated, replace as much Portland cement as possible with fly ash, ground granulated blast furnace slag, silica fume, or rice hull ash as is consistent with ACI recommendations.
   2. Compressive Strength: f'c = 4500 PSI at 28 days.
   3. Slump: 4" +/- 1". May be increased to 8" maximum with approve admixture. 2500 PSI used for design.
   4. Maximum Water-Cement Materials Ratio: 0.47.
   5. Air Content: Add air-entraining to concrete permanently exposed to weather and freeze/thaw cycles at manufacturer's prescribed rate to result in concrete at the point of placement having the air content specified in the General Structural Notes.

B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.

C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.

D. Cementitious Materials: Limit percentage as follows:
   1. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
   2. Calcined Pozzolan Content: Maximum 10 percent of cementitious materials by weight.
   3. Silica Fume Content: Maximum 5 percent of cementitious materials by weight.

2.08 **MIXING**

A. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

B. Transit Mixers: Measure, batch, mix, and deliver concrete according to ASTM C94/C94M and ASTM C1116/C1116M, and furnish batch ticket information.
   1. When air temperature si between 85 and 90 degrees F., reduce mixing and delivery time from 90 minutes to 75 minutes; when air temperature is above 90 deg. F., reduce mixing and delivery to 60 minutes.

PART 3 EXECUTION

3.01 **EXAMINATION**

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 **PREPARATION**

A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.

B. Verify that forms are clean and free of rust before applying release agent.

C. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.

D. Prepare existing concrete surfaces to be repaired according to ICRI 310.2R, [_____].

E. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

3.03 **INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS**

A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.

B. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

3.04 **PLACING CONCRETE**

A. Place concrete in accordance with ACI 304R.

B. Place concrete for floor slabs in accordance with ACI 302.1R.

C. Notify Architect not less than 24 hours prior to commencement of placement operations.

D. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

E. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance by sandblasting or high-pressure water jetting.

F. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.05 **CONCRETE FINISHING**

A. Repair surface defects, including tie holes, immediately after removing formwork.

B. Interior Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:

1. Surfaces to Receive Thick Floor Coverings: "Wood float" as described in ACI 302.1R; thick floor coverings include quarry tile, ceramic tile, and Portland cement terrazzo with full bed setting system.
2. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, resinous matrix terrazzo, thin set quarry tile, and thin set ceramic tile.
3. Exposed Surfaces: Trowel as described in ACI 302.1R; use steel-reinforced plastic trowel blades instead of steel blades to avoid black-burnish marks; decorative exposed surfaces include surfaces to be stained or dyed, pigmented concrete, surfaces to receive liquid hardeners, surfaces to receive dry-shake hardeners, surfaces to be polished, and all other exposed slab surfaces.

C. Exterior Concrete Slabs: Light Broom finish.

3.06 **CURING AND PROTECTION**

A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

1. Normal concrete: Not less than seven days.
2. High early strength concrete: Not less than four days.

C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.

D. Surfaces Not in Contact with Forms:

1. Evaporation Reducer: Apply evaporation reducer to unformed concrete surfaces of slabs receivig Polished Finish work of 03 3511. Apply evaporation reducer to other slabs if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. per hour before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding and bull floating or darbying concrete, but before float finish.
2. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.

3. Final Curing: Begin after initial curing but before surface is dry.
    a. Moisture-Retaining Sheet: Lap strips not less than 3 inches and seal with waterproof tape or adhesive; secure at edges.
    b. Absorptive Cover: Place contiguously over concrete surfaces in widest width practical, with edges lapped 4 inches.
    c. Curing Compound: Not permitted.

3.07 **DEFECTIVE CONCRETE**

A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.
B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.
C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.08 **PROTECTION**

A. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION

SECTION 06 1000
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. **Structural dimension lumber framing.**
B. Non-structural dimension lumber framing.
C. **Sheathing.**
D. Roof-mounted curbs.
E. Preservative treated wood materials.
F. Miscellaneous framing and sheathing.
G. Concealed wood blocking, nailers, and supports.
H. Miscellaneous wood nailers, furring, and grounds.

1.02 RELATED REQUIREMENTS

A. Section 016116 - VOC Limitations.
B. Section 09 2116 - Gypsum Board Assemblies: Gypsum-based sheathing.

1.03 REFERENCE STANDARDS

A. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings 2015.
B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
C. AWPA U1 - Use Category System: User Specification for Treated Wood 2012.
D. PS 1 - Structural Plywood 2009.
E. PS 2 - Performance Standard for Wood-Based Structural-Use Panels 2010.
F. PS 20 - American Softwood Lumber Standard 2010.
G. WWPA G-5 - Western Lumber Grading Rules 2011.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide technical data on wood preservative materials and application instructions.
C. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

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

1.06 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
B. Correct defective Work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. Species: Douglas Fir-Larch, unless otherwise indicated.
   2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.

3. Grading Agency: 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.
4. Lumber of other species or grades is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.

2.02 **DIMENSION LUMBER**

A. Grading Agency: Western Wood Products Association; WWPA G-5.
B. Sizes: Nominal sizes as indicated on drawings, S4S.
C. Moisture Content: S-dry or MC19, unless noted otherwise in Structural General Notes.
D. Wood Framing (2 by 2 through 2 by 6):
   1. Grade: 2.
E. Joist, Rafter, and Small Beam Framing (2 by 6 through 4 by 16):
   1. Grade: No. 1 and Better.
F. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade.
   2. Boards: Standard or No. 3.

2.03 **CONSTRUCTION PANELS**

A. **Roof Sheathing: APA PRP-108, Structural I Rated Sheathing, Exterior Exposure Class, and as follows:**
   1. **Span Rating: 24/16.**
   2. **Thickness: 1/2 inch, nominal.**
B. **Wall Sheathing: Any PS 2 type.**
   1. **Bond Classification: Exterior.**
   2. **Grade: Structural I Sheathing.**
   3. **Span Rating: 24.**
   4. **Performance Category: 5/16 PERF CAT.**
   5. **Edge Profile: Square edge.**

2.04 **ACCESSORIES**

A. Fasteners and Anchors:
   1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
   2. Drywall Screws: Bugle head, hardened steel, power driven type, length three times thickness of sheathing.
   3. Anchors: Bolt or ballistic fastener for anchorages to steel.
B. Deflection Clip: 18 gauge galvanized steel clip with 1 1/2" slot. Simpson STC or similar.

2.05 **FACTORY WOOD TREATMENT**

A. Treated Lumber and Plywood: Comply with requirements of AWPA 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 AWPA standards.
B. (PT) Preservative Treatment:
   1. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
      a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
      b. Treat lumber exposed to weather.

c. Treat lumber in contact with roofing, flashing, or waterproofing.
d. Treat lumber in contact with masonry or concrete.
e. Treat lumber less than 6 inches above grade.
f. Treat lumber in other locations as indicated.

2. Preservative Pressure Treatment of Lumber in Contact with Soil: AWPA U1, Use Category UC4A, Commodity Specification A using waterborne preservative.
   a. Preservative for Field Application to Cut Surfaces: As recommended by manufacturer of factory treatment chemicals for brush-application in the field.
   b. Restrictions: Do not use lumber or plywood treated with chromated copper arsenate (CCA) in exposed exterior applications subject to leaching.

PART 3 EXECUTION

3.01 PREPARATION

A. Where wood framing bears on cementitious foundations, install full width sill flashing continuous over top of foundation, lap ends of flashing minimum of 4 inches and seal.

3.02 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.
B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.03 FRAMING INSTALLATION

A. 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.
B. 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.
C. Install structural members full length without splices unless otherwise specifically detailed.
D. 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.
E. Install horizontal spanning members with crown edge up and not less than 1-1/2 inches of bearing at each end.
F. 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.
G. Provide bridging at joists in excess of 8 feet span as detailed. Fit solid blocking at ends of members.
H. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.
I. Where top of wall plate meets roof framing and roof deck, provide deflection gap with deflection clips. At roof framing, provide deflection clip at each framing member. At roof deck, provide deflection clip at 16 inches maximum on center, aligned with studs.

3.04 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
B. Coordinate with other trades, preference for wood supports or metal strapping.
C. 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.

D. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.
E. 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.
F. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

3.05 **ROOF-RELATED CARPENTRY**

A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
B. Provide wood curb at all roof openings except where specifically indicated otherwise. Form corners by alternating lapping side members.

3.06 **INSTALLATION OF CONSTRUCTION PANELS**

A. **Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.**
   1. **At long edges use sheathing clips where joints occur between roof framing members.**
   2. **Nail panels to framing; staples are not permitted.**
B. **Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.**

3.07 **SITE APPLIED WOOD TREATMENT**

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

3.08 **TOLERANCES**

A. Framing Members: 1/4 inch from true position, maximum.
B. Surface Flatness of Floor: 1/8 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.
C. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.09 **CLEANING**

A. Waste Disposal: Comply with the requirements of Section 01 7419 - Construction Waste Management and Disposal.
   1. Comply with applicable regulations.
   2. Do not burn scrap on project site.
   3. Do not burn scraps that have been pressure treated.
   4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.
B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 07 6200
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fabricated sheet metal items.

1.02 REFERENCE STANDARDS

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels 2013.
B. CDA A4050 - Copper in Architecture - Handbook current edition.
C. SMACNA (ASMM) - Architectural Sheet Metal Manual 2012.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

1.04 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.
B. Maintain one copy of each document on site.
C. Fabricator and Installer Qualifications: Company specializing in sheet metal work with [____] years of documented experience.
D. Mock-Up: Construct mock-up of each condition indicated in drawings. Notify Architect for review. Mock-up may remain as part of the Work.

1.05 DELIVERY, STORAGE, AND HANDLING

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

PART 2 PRODUCTS

2.01 SHEET MATERIALS

A. Pre-Finished Aluminum Zinc Alloy Coated Steel Sheet: ASTM A792 with AZ50 coating (same material as roofing panels).
   1. Same PVDF color and finish as roofing panels in Section 07 4113 - Metal Roofing.
B. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; shop pre-coated with PVDF coating.
   1. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
   2. Color: As selected by Architect from manufacturer's standard colors.

2.02 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
B. Form pieces in longest possible lengths.
C. Hem exposed edges on underside 1/2 inch; miter and seam corners.
D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
E. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.

F. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.
G. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 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.

3.03 INSTALLATION

A. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..
B. Apply plastic cement compound between metal flashings and felt flashings.
C. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.
D. Seal metal joints watertight.

3.04 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for field inspection requirements.
B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

3.05 SCHEDULE

A. Counterflashings at curb mounted roof items, including skylights and hatches.
   1. Material: GALV FLASHING.
   2. Thickness: 26 gage.
   3. Color: Grey.

END OF SECTION

SECTION 07 8400
FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Firestopping of joints and penetrations in fire resistance rated and smoke resistant assemblies, whether indicated on drawings or not, and other openings indicated.

1.02 RELATED REQUIREMENTS

A. Section 01 6116 - VOC Limitations.
B. Section 01 3316 - Delegated Design Requirements.
C. Section 01 7000 - Execution and Closeout Requirements: Cutting and patching.

1.03 REFERENCE STANDARDS

A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials 2020.
B. ASTM E814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops 2013a.
C. ASTM E1966 - Standard Test Method for Fire Resistive Joint Systems 2007 (Reapproved 2011).
D. ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus 2015a.
E. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies 2013.
F. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi 2015.
G. ITS (DIR) - Directory of Listed Products current edition.
H. FM 4991 - Approval Standard for Firestop Contractors 2013.
I. FM (AG) - FM Approval Guide current edition.
J. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168 current edition.
K. UL 1479 - Standard for Fire Tests of Penetration Firestops Current Edition, Including All Revisions.
L. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems Current Edition, Including All Revisions.
M. UL (DIR) - Online Certifications Directory current listings at database.ul.com.
N. UL (FRD) - Fire Resistance Directory current edition.

1.04 PERFORMANCE REQUIREMENTS

A. Without regard to the trade that performed the Work, provide firestopping at each joint and penetration in fire-resistive assemblies forming floors, roofs, shaft enclosures, exit enclosures, occupancy separations and corridors. Seal all holes or voids to provide effective barrier against flame, smoke and gases.
B. Conform to Oregon Structural Specialty Code for fire-resistance ratings, surface burning characteristics, F-Rating and T-Rating requirements.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Delegated Design - Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
C. Product Data: Provide data on product characteristics, performance ratings, and limitations.

D. Sustainable Design Submittal: Submit VOC content documentation for all non-preformed materials.
E. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.

1.06 **QUALITY ASSURANCE**

A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
   1. Listing in UL (FRD), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.
   2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at www.icc-es.org will be considered as constituting an acceptable test report.
   3. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.
B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
C. Installer Qualifications: Company specializing in performing the work of this section and:
   1. Trained by manufacturer.
   2. Approved by Factory Mutual Research Corporation under FM 4991, or meeting any two of the following requirements:
   3. Verification of minimum three years documented experience installing work of this type.
   4. Verification of at least five satisfactorily completed projects of comparable size and type.
   5. Licensed by local authorities having jurisdiction (AHJ).

1.07 **FIELD CONDITIONS**

A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.
B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.01 **MATERIALS**

A. Manufacturers:
   1. A/D Fire Protection Systems Inc.
   2. 3M Fire Protection Products.
   3. Nelson FireStop Products.
   4. Specified Technologies, Inc.
B. Firestopping Materials: Any materials meeting requirements.
C. Volatile Organic Compound (VOC) Content: Provide products having VOC content lower than that required by SCAQMD 1168.
D. Mold and Mildew Resistance: Provide firestoppping materials with mold and mildew resistance rating of zero(0) in accordance with ASTM G21.
E. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.
F. Fire Ratings: Refer to drawings for required systems and ratings.

2.02 **FIRESTOPPING ASSEMBLY REQUIREMENTS**

A. Perimeter Fire Containment Firestopping: Use system that has been tested according to ASTM E2307 to have fire resistance F Rating equal to required fire rating of floor assembly.
   1. Movement: Provide systems that have been tested to show movement capability as indicated.
   2. Temperature Rise: Provide systems that have been tested to show T Rating as indicated.

3. Air Leakage: Provide systems that have been tested to show L Rating as indicated.
4. Where floor assembly is not required to have a fire rating, provide systems that have been tested to show L Rating as indicated.

B. Head-of-Wall Joint System Firestopping at Joints Between Fire-Rated Wall Assemblies and Non-Rated Horizontal Assemblies: Use system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of floor or wall, whichever is greater.
1. Movement: Provide systems that have been tested to show movement capability as indicated.

C. Floor-to-Floor, Wall-to-Wall, and Wall-to-Floor Joints, Except Perimeter, Where Both Are Fire-Rated: Use system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.
1. Movement: Provide systems that have been tested to show movement capability as indicated.
2. Air Leakage: Provide systems that have been tested to show L Rating as indicated.
3. Watertightness: Provide systems that have been tested to show W Rating as indicated.
4. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.

D. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.
1. Temperature Rise: Provide systems that have been tested to show T Rating as indicated.
2. Air Leakage: Provide systems that have been tested to show L Rating as indicated.
3. Watertightness: Provide systems that have been tested to show W Rating as indicated.
4. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.

2.03 **FIRESTOPPING SYSTEMS**

A. Firestopping: Any material meeting requirements.
1. Fire Ratings: Use system that is listed by FM (AG), ITS (DIR), or UL (FRD) and tested in accordance with ASTM E814, ASTM E119, or UL 1479 with F Rating equal to fire rating of penetrated assembly and minimum T Rating Equal to F Rating and in compliance with other specified requirements.

PART 3 EXECUTION

3.01 **EXAMINATION**

A. Verify openings are ready to receive the work of this section.

3.02 **PREPARATION**

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.
B. Remove incompatible materials that could adversely affect bond.
C. Install backing materials to prevent liquid material from leakage.

3.03 **INSTALLATION**

A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
B. Do not cover installed firestopping until inspected by authorities having jurisdiction.
C. Install labeling required by code.

3.04 **CLEANING**

A. Clean adjacent surfaces of firestopping materials.

3.05 **PROTECTION**

A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 07 9200
JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nonsag gunnable joint sealants.
B. Joint backings and accessories.

1.02 RELATED REQUIREMENTS

A. Section 01 6116 - VOC Limitations: Additional requirements for sealants and primers.

1.03 REFERENCE STANDARDS

A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer 2006 (Reapproved 2011).
B. ASTM C834 - Standard Specification for Latex Sealants 2014.
C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2014.
D. ASTM C1193 - Standard Guide for Use of Joint Sealants 2013.
E. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants 2008 (Reapproved 2012).
F. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants 2002 (Reapproved 2013).
G. SWRI (VAL) - SWR Institute Validated Products Directory Current Listings at www.swrionline.org.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
   1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
   2. List of backing materials approved for use with the specific product.
   3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
   4. Substrates the product should not be used on.
   5. Substrates for which use of primer is required.
   6. Substrates for which laboratory adhesion and/or compatibility testing is required.
   7. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
   8. Sample product warranty.
   9. Certification by manufacturer indicating that product complies with specification requirements.
   10. SWRI Validation: Provide currently available sealant product validations as listed by SWRI (VAL) for specified sealants.
C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

1.05 **QUALITY ASSURANCE**

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
B. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.

1.06 **WARRANTY**

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
B. Correct defective work within a five year period after Date of Substantial Completion.
C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal , exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 **MANUFACTURERS**

A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
   1. Adhesives Technology Corporation.
   2. BASF Construction Chemicals-Building Systems.
   3. Bostik Inc.
   4. Dow Corning Corporation.
   5. Pecora Corporation.
   6. Tremco Global Sealants.
   7. W.R. Meadows, Inc.
   8. Substitutions: See Section 01 6000 - Product Requirements.

2.02 **JOINT SEALANT APPLICATIONS**

A. Scope:
   1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
      a. Other joints indicated below.
   2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
      a. Joints between door, window, and other frames and adjacent construction.
      b. Other joints indicated below.
   3. Do not seal the following types of joints.
      a. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
      b. Joints where installation of sealant is specified in another section.
B. Exterior Joints: Use non-sag non-staining silicone sealant, unless otherwise indicated.
C. Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.
   1. Wall and Ceiling Joints in Wet Areas: Non-sag polyurethane sealant for continuous liquid immersion.
   2. Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.
   3. In Sound-Rated Assemblies: Acrylic emulsion latex sealant.
   4. Narrow Control Joints in Interior Concrete Slabs: Self-leveling epoxy sealant.
   5. Other Floor Joints: Self-leveling polyurethane "traffic-grade" sealant.

2.03 **JOINT SEALANTS - GENERAL**

A. Sealants and Primers: Provide products with levels of volatile organic compound (VOC) content as indicated in Section 01 6116.

2.04 **NONSAG JOINT SEALANTS**

Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.

1. Movement Capability: Plus and minus 50 percent, minimum.
2. Non-Staining To Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.
3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
4. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.
5. Color: Match adjacent finished surfaces.
6. Service Temperature Range: Minus 20 to 180 degrees F.

Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.

7. Movement Capability: Plus and minus 50 percent, minimum.
8. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
9. Color: To be selected by Architect from manufacturer's standard range.
10. Service Temperature Range: Minus 40 to 180 degrees F.

Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.

11. Color: To be selected by Architect from manufacturer's standard range.
12. Grade: ASTM C834; Grade Minus 18 Degrees C (0 Degrees F).

2.05 **ACCESSORIES**

A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
   1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O - Open Cell Polyurethane.
   2. Open Cell: 40 to 50 percent larger in diameter than joint width.
B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.
E. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

PART 3 EXECUTION

3.01 **EXAMINATION**

A. Verify that joints are ready to receive work.
B. Verify that backing materials are compatible with sealants.
C. Verify that backer rods are of the correct size.

3.02 **PREPARATION**

A. Remove loose materials and foreign matter that could impair adhesion of sealant.
B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 **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 backing tape where backer rod cannot be used.
E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

END OF SECTION

SECTION 08 1113
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire-rated hollow metal doors and frames.

1.02 RELATED REQUIREMENTS

A. Section 08 7100 - Door Hardware.
B. Section 09 9123 - Interior Painting: Field painting.

1.03 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
B. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.
C. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors 2011.
D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100) 2014.
E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames 2011.
F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2015.
G. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable 2015.
H. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2014.
I. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames 2014.
J. ICC A117.1 - Accessible and Usable Buildings and Facilities 2009.
K. ITS (DIR) - Directory of Listed Products current edition.
L. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames 2002.
M. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames 2011.
N. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2016.
O. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives 2016.
P. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies 2017.
Q. UL (DIR) - Online Certifications Directory Current Edition.
R. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.
S. UL 1784 - Standard for Air Leakage Tests of Door Assemblies Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.
C. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.

D. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

1.05 **QUALITY ASSURANCE**

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.
B. Maintain at project site copies of reference standards relating to installation of products specified.

PART 2 PRODUCTS

2.01 **MANUFACTURERS**

A. Hollow Metal Doors and Frames:
   1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com/#sle.
   2. Republic Doors, an Allegion brand: www.republicdoor.com/#sle.
   3. Steelcraft, an Ingersoll Rand brand; Product [____].
   4. Stiles**.**
   5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 **PERFORMANCE REQUIREMENTS**

A. Requirements for Hollow Metal Doors and Frames:
   1. Steel Sheet: Comply with one or more of the following requirements; galvannealed steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
   2. Accessibility: Comply with ICC A117.1 and ADA Standards.
   3. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.
   4. Door Edge Profile: Manufacturers standard for application indicated.
   5. Typical Door Face Sheets: Flush.
   6. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturers standard.
   7. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
   8. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvannealed) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.
      a. Based on SDI Standards: Provide at least A40/ZF120 (galvannealed) when necessary, coating not required for typical interior door applications, and at least A60/ZF180 (galvannealed) for corrosive locations.
B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with 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.

2.03 **HOLLOW METAL DOORS**

A. Door Finish: Factory primed and field finished.
B. Fire-Rated Doors:
   1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
      a. Level 3 - Extra Heavy-duty.
      b. Physical Performance Level A 1 000 000 cycles; in accordance with ANSI/SDI A250.4.

c. Model 2 - Seamless.
d. Door Face Metal Thickness: 16 gage, 0.053 inch, minimum.

2. Fire Rating: 1 hour, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
   a. Temperature-Rise Rating (TRR) Across Door Thickness: In accordance with local building code and authorities having jurisdiction.
   b. Provide units listed and labeled by UL (DIR) or ITS (DIR).
   c. Attach fire rating label to each fire rated unit.
   d. Smoke and Draft Control Doors (Indicated with letter "S" on Drawings and/or Door Schedule): Self-closing or automatic closing doors in accordance with NFPA 80 and NFPA 105, with fire-resistance-rated wall construction rated the same or greater than the fire-rated doors, and the following;
      1) Maximum Air Leakage: 3.0 cfm/sq ft of door opening at 0.10 inch w.g. pressure, when tested in accordance with UL 1784 at both ambient and elevated temperatures.
      2) Gasketing: Provide gasketing or edge sealing as necessary to achieve leakage limit.
      3) Label: Include the "S" label on fire-rating label of door.
3. Door Core Material: Manufacturers standard core material/construction in compliance with requirements.
4. Door Thickness: 1-3/4 inch, nominal.

2.04 **HOLLOW METAL FRAMES**

A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
B. Door Frames, Fire-Rated: Full profile/continuously welded type.
   1. Fire Rating: Same as door, labeled.
   2. Terminated Stops: Provide at interior doors; closed end stop terminated 6 inch, maximum, above floor at 45 degree angle.
   3. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
   4. Frame Finish: Factory primed and field finished.
C. Frames Wider than 48 inches: Reinforce with steel channel fitted tightly into frame head, flush with top.

2.05 **FINISHES**

A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.06 **ACCESSORIES**

A. Door Window Frames: Door window frames with glazing securely fastened within door opening.
   1. Size: As indicated on drawings. 100 square inches maximum.
   2. Glazing: 60 minute fire rated safety glass, in compliance with requirements of authorities having jurisdiction.
B. Mechanical Fasteners for Concealed Metal-to-Metal Connections: Self-drilling, self-tapping, steel with electroplated zinc finish.
C. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
D. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

PART 3 EXECUTION

3.01 PREPARATION

A. Coat inside of other frames with bituminous coating to a thickness of 1/16 inch.

3.02 INSTALLATION

A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
B. Install fire rated units in accordance with NFPA 80.
C. Coordinate frame anchor placement with wall construction.
D. Install door hardware as specified in Section 08 7100.
E. Coordinate installation of electrical connections to electrical hardware items.
F. Touch up damaged factory finishes.

END OF SECTION

SECTION 08 3100
ACCESS DOORS AND PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Ceiling mounted access units.

1.02 RELATED REQUIREMENTS

A. Section 09 2116 - Gypsum Board Assemblies: Openings in metal framed partitions and ceilings.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
C. Shop Drawings: Indicate exact position of each access door and/or panel unit.
D. Manufacturer's Installation Instructions: Indicate installation requirements.
E. Project Record Documents: Record actual locations of each access unit.

PART 2 PRODUCTS

2.01 ACCESS DOORS AND PANELS ASSEMBLIES

A. Ceilings, Non-Fire-Rated.
   1. Material: Steel.
   2. In Gypsum Board: Flanged frame with door surface flush with ceiling surface.
   3. Size: 30 inch by 30 inch.
   4. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
   5. Finish: Primed for field paint finish.

2.02 CEILING MOUNTED ACCESS UNITS

A. Manufacturers, subject to meeting specified requirements:
   1. Acudor Products Inc.
   2. Cendrex, Inc.
   3. Karp Associates, Inc.
   4. Milcor by Commercial Products Group of Hart & Cooley, Inc.
   5. Williams Brothers Corporation of America: www.wbdoors.com.
   6. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

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

END OF SECTION

SECTION 08 7100
DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hardware for wood and hollow metal doors.
B. Hardware for fire-rated doors.
C. Thresholds.
D. Weatherstripping, seals and door gaskets.

1.02 RELATED REQUIREMENTS

A. Section 081113 - Hollow Metal Doors and Frames: Hardware Coordination.

1.03 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 2004.
D. ICC A117.1 - Accessible and Usable Buildings and Facilities 2009.
E. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2016.
F. NFPA 101 - Life Safety Code 2015.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the manufacture, fabrication, and installation of products that door hardware will be installed upon.
B. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.
C. Convey Owner's keying requirements to manufacturers.
D. Preinstallation Meeting: Convene a preinstallation meeting one week prior to commencing work of this section; require attendance by all affected installers.
E. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project.
C. Hardware Schedule: 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.
D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.
E. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
    1. Submit manufacturer's parts lists.
    2. Bitting List: List of combinations as furnished.
F. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.

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

1.06 **QUALITY ASSURANCE**

A. Standards for Fire-Rated Doors: Maintain one copy of each referenced standard on site, for use by Architect and Contractor.
B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
C. Hardware Supplier Qualifications: Company specializing in supplying commercial door hardware with 5 years of experience.

1.07 **DELIVERY, STORAGE, AND HANDLING**

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

1.08 **WARRANTY**

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
B. Provide five year warranty for door closers.

PART 2 PRODUCTS

2.01 **DOOR HARDWARE - GENERAL**

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. Provide products that comply with the following:
   1. Applicable provisions of federal, state, and local codes.
   2. Accessibility: ADA Standards and ICC A117.1.
   3. ANSI/ICC A117.1, American National Standard for Accessible and Usable Buildings and Facilities.
   4. Applicable provisions of NFPA 101, Life Safety Code.
   5. Fire-Rated Doors: NFPA 80.
   6. Hardware on Fire-Rated Doors, Except Hinges: Listed and classified by UL (DIR) as suitable for the purpose specified and indicated.
D. Finishes: Identified in schedule.

2.02 **LOCKS AND LATCHES**

A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.
   1. If no hardware set is indicated for a swinging door provide an office lockset.
   2. Trim: Provide lever handle or pull trim on outside of all locks unless specifically stated to have no outside trim.
   3. Lock Cylinders: Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.
B. Lock Cylinders: Manufacturer’s standard tumbler type, six-pin standard core.
   1. Provide cams and/or tailpieces as required for locking devices required.
C. Keying: Coordinate keying with Owner and existing hardware in the building..
D. Latches: Provide a latch for every door that is not required to lock, unless specifically indicated "push/pull" or "not required to latch".

PART 3 EXECUTION

3.01 **EXAMINATION**

A. 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.

3.02 **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. As indicated in the following list; unless noted otherwise in Door Hardware Sets Schedule or on the drawings.
   1. For steel doors: Comply with DHI "Recommended Locations for Architectural Hardware for Steel Doors and Frames."

3.03 **FIELD QUALITY CONTROL**

3.04 **ADJUSTING**

A. Adjust work under provisions of Section 01 7000.
B. Adjust hardware for smooth operation.
C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

3.05 **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.

3.06 **PROTECTION**

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

3.07 **SCHEDULE**

A. Spray Room Door

QTY		DESCRIPTION	CATALOG NO.	FINISH	MFR
8	EA	HINGE	5BB1HW 5 X 4.5 NRP	652	IVE
1	SET	AUTO FLUSH BOLT	**FB31T**	630	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	VANDL VESTIBULE LOCK	ND93P6D SPA XN12-035 K510-066	626	SCH
1	EA	COORDINATOR	COR X FL	628	IVE
4	EA	MOUNTING BRACKET	MB	689	LCN
1	EA	CARRYBAR	CB1	652	IVE
2	EA	SURFACE CLOSER	4111 DEL SCUSH WMS	689	LCN
2	EA	ARMOR PLATE	8400 30" X 2" LDW B-CS	630	IVE
4	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	ASTRAGAL	43SP	SP	ZER
2	EA	DOOR SWEEP	8192AA	AA	ZER

VERIFY KEYWAY

B. Compressor Enclosure Door
   1. Hinges provided by Pre-hung door supplier.
   2. Provide storage room lockset to match manufacturer and series as spray room door.
   3. Provide gasketing at frame.

END OF SECTION

SECTION 09 2116
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal stud wall framing.
B. Metal furring at ceiling for support of gypsum board finishes.
C. Acoustic insulation.
D. Gypsum wallboard.
E. Joint treatment and accessories.
F. Textured finish system.

1.02 RELATED REQUIREMENTS

A. Section 016116 - VOC Limitations.
B. Section 06 1000 - Rough Carpentry: Building framing and sheathing.
C. Section 07 8400 - Firestopping: Top-of-wall assemblies at fire rated walls.

1.03 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 2020).
C. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing 2003 (Reapproved 2009).
D. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing 2012.
E. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board 2013.
F. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base 2014a.
G. ASTM C1396/C1396M - Standard Specification for Gypsum Board 2014.
H. GA-216 - Application and Finishing of Gypsum Panel Products 2016.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.

PART 2 PRODUCTS

2.01 METAL FRAMING MATERIALS

A. Manufacturers - Metal Framing, Connectors, and Accessories. Manufacturer's approval is subject to compliance with the specified requirements listed below.
   1. Allied Studco.
   2. AllSteel & Gypsum Products, Inc.
   3. California Expanded Metal Products Company.
   4. Clark Dietrich Building Systems LLC.
   5. Consolidated Fabricators Corp.
   6. Craco Metals Manufacturing, LLC.
   7. Custom Stud, Inc.
   8. Dale/Incor.
   9. Design Shapes in Steel.

10. Formetal Co. Inc.
11. Innovative Steel Systems.
12. Marino/Ware.
13. Quail Run Building Materials, Inc.
14. SCAFCO Corporation.
15. Southeastern Stud & Components, Inc.
16. Steel Construction Systems.
17. Steeler, Inc.
18. Super Stud Building Products, Inc.
19. United Metal Products, Inc.
20. Phillips Manufacturing Company.
21. The Steel Network, Inc.

B. Non-structural 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/120 at 5 psf.
   1. Studs: "C" shaped, 24 gage unless otherwise noted.
   2. Runners: U shaped, sized to match studs.
   3. Furring at ceiling: Hat-shaped sections, 1-1/2" depth, 16 gage.

C. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.
   1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI S100-12.
   2. Material: ASTM A653/A653M steel sheet, SS Grade 50/340, with G60/Z180 hot dipped galvanized coating.
   3. Provide components UL-listed for use in UL-listed fire-rated head of partition joint systems indicated on drawings.
   4. Deflection and Firestop Track:
      a. Products:
         1) Substitutions: See Section 01 6000 - Product Requirements.
   5. Provide top track preassembled with connection devices spaced to fit stud spacing indicated on drawings; minimum track length of 12 feet.

2.02 **(GWB) BOARD MATERIALS**

A. Manufacturers - Gypsum-Based Board:
   1. American Gypsum Company.
   2. CertainTeed Corporation.
   3. Georgia-Pacific Gypsum.
   4. National Gypsum Company.
   5. USG Corporation.
   6. Substitutions: See Section 01 6000 - Product Requirements.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Use for vertical surfaces, unless otherwise indicated.
   2. Type: Fire resistance rated Type X, UL or WH listed.
   3. Thickness:
      a. Vertical Surfaces: 5/8 inch.
      b. Ceilings: 5/8 inch.

2.03 **GYPSUM WALLBOARD ACCESSORIES**

A. Acoustic Insulation: ASTM C665; preformed glass fiber or mineral wool, friction fit type, unfaced.
   1. Thickness: full cavity at walls, unless otherwise noted. 6 inches at ceiling.
   2. Facing: unfaced.
   3. Density: 2.5 pcf.
   4. Recycled Content: greater than 70%

B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
   1. Products:
      a. Franklin International, Inc; Titebond GREENchoice Professional Acoustical Smoke and Sound Sealant: www.titebond.com/#sle.
      b. Liquid Nails, a brand of PPG Architectural Coatings; AS-825 Acoustical Sound Sealant: www.liquidnails.com/#sle.
      c. Specified Technologies Inc; Smoke N Sound Acoustical Sealant: www.stifirestop.com/#sle.
      d. Substitutions: See Section 01 6000 - Product Requirements.

C. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
   1. Types: As detailed or required for finished appearance.
   2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed panel edges.

D. Beads, Joint Accessories, and Other Trim: ASTM C1047, rigid plastic, galvanized steel, or rolled zinc, unless noted otherwise.
   1. Architectural Reveal Beads:
      a. Reveal Depth: 1/2 inch.
      b. Reveal Width: 1/2 inch.

E. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.

F. 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.

G. Nails for Attachment to Wood Members: ASTM C514.

H. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

PART 3 EXECUTION

3.01 **EXAMINATION**

A. Verify that project conditions are appropriate for work of this section to commence.

B. Verify prior to beginning installation that hangers, suspension system, and framing will not interfere with other Work.

C. Verify prior to beginning installation that other Work is coordinated with suspension system.

3.02 **FRAMING INSTALLATION**

A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.

B. Studs: Space studs as permitted by standard,but no greater than 16 inches on center.
   1. Extend partition framing to structure where indicated and to ceiling in other locations.
   2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
   3. Partitions Terminating at Structure: 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; verify free movement of top of stud connections; do not leave studs unattached to track.

C. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.
D. Installation over existing walls and ceilings for Fire Ratings: Install as required for fire resistance ratings indicated and to GA-600 requirements.
E. Blocking and Backing: Install metal, wood, or other backing as indicated or required for support of:
   1. Framed openings.
   2. Other wall or ceiling mounted items indicated.

3.03 **ACOUSTIC ACCESSORIES INSTALLATION**

A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
B. Acoustic Sealant: Install in accordance with manufacturer's instructions.
   1. Place one bead continuously on substrate before installation of perimeter framing members.
   2. Place continuous bead at perimeter of each layer of gypsum board.
   3. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.

3.04 **BOARD INSTALLATION**

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
B. Single-Layer Non-Rated: At walls, Install gypsum board in most economical direction, with ends and edges occurring over firm bearing. At ceilings, install gypsum board at right angles to framing, with ends occurring over firm bearing.
   1. Exception: Tapered edges to receive joint treatment at right angles to framing.
C. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
D. Installation on Wood Framing: For rated assemblies, comply with requirements of listing authority. For non-rated assemblies, install as follows:
   1. Single-Layer Applications: Single-nailing.

3.05 **INSTALLATION OF TRIM AND ACCESSORIES**

A. Corner Beads: Install at external corners, using longest practical lengths.
B. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.06 **JOINT TREATMENT**

A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 4: Walls and ceilings to receive textured wall finish, paint finish and wall coverings.
   2. Level 2: At air compressor enclosure walls, other than front wall with door.
   3. Level 0: At air compressor enclosure front wall with door. Install acoustic sealant at all edges and joints.
B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch.
   2. Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.
   3. Taping, filling and sanding is not required at base layer of double layer applications.

3.07 **TEXTURE FINISH**

A. Applications: Spray room walls and ceiling, infill wall.
B. Apply finish texture coating by means of spraying apparatus in accordance with manufacturer's instructions and to match approved sample.
C. Finish: "Light Orange Peel", maximum splatter size: 1/8"

3.08 **TOLERANCES**

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09 9123
INTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.
B. Field application of paints.
C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
   1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
   2. Surfaces inside cabinets.
   3. Mechanical and Electrical:
      a. In finished areas, paint 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 and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
      d. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise 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, bar code labels, and operating parts of equipment.
   5. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, and lead items.
   6. Floors, unless specifically indicated.
   7. Ceramic and other tiles.
   8. Glass.
   9. Concrete masonry units in utility, mechanical, and electrical spaces.
   10. Acoustical materials, unless specifically indicated.
   11. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

A. Section 01 6116 - VOC Limitations.
B. Section 05 5000 - Metal Fabrications: Shop-primed items.

1.03 DEFINITIONS

A. Comply with ASTM D16 for interpretation of terms used in this section.

1.04 REFERENCE STANDARDS

A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications 2014.
B. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials 2007.

C. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association Current Edition.
D. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual Current Edition.
E. SSPC-SP 1 - Solvent Cleaning 2015.
F. SSPC-SP 2 - Hand Tool Cleaning 2018.
G. SSPC-SP 6 - Commercial Blast Cleaning 2007.

1.05 **SUBMITTALS**

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system. Indicate primer to be used in each substrate; show the source of the manufacturer's recommendation for each primer to be used on each substrate, for each top-coat.
   4. Manufacturer's installation instructions.
   5. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.

1.06 **QUALITY ASSURANCE**

A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 5 years experience and approved by manufacturer.

1.07 **DELIVERY, STORAGE, AND HANDLING**

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.08 **FIELD CONDITIONS**

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
C. Do not apply materials when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.
D. Minimum Application Temperatures for Paints: 50 degrees F for interiors unless required otherwise by manufacturer's instructions.
E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 **MANUFACTURERS**

A. Provide paints and finishes from the same manufacturer to the greatest extent possible.
   1. In the event that a single manufacturer cannot provide specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.

2. Substitution of MPI-approved products by a different manufacturer is preferred over substitution of unapproved products by the same manufacturer.
3. Substitution of a different paint system using MPI-approved products by the same manufacturer will be considered.

B. Paints:
1. Benjamin Moore & Co.
2. Cloverdale Paint, Brand Products of Rodda Paint Company.
3. Glidden Professional, a product of PPG Architectural Coatings.
4. PPG Paints.
5. Rodda Paint Co.
6. Sherwin-Williams Company.
7. Valspar Corporation.
8. Miller Paint.

C. Transparent Finishes:
1. Sherwin-Williams Company.
2. Benjamin Moore.
3. Cloverdale Paint.
4. Old Masters.

D. Primer Sealers: Same manufacturer as top coats.

E. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
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 finishes 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. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
4. 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.
5. Supply each paint material in quantity required to complete entire project's work from a single production run.
6. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content: Comply with Section 01 6116.

C. Flammability: Comply with applicable code for surface burning characteristics.

D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

E. Colors: Match adjacent existing walls and ceilings.
1. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under, unless noted otherwise.
2. In utility areas, finish equipment, piping, conduit, and exposed duct work in colors according to the color schedule.

2.03 PAINT SYSTEMS - INTERIOR

A. Paint I-OP - "Interior Opaque" Surfaces to be painted, vertical and overhead, unless otherwise indicated: Including gypsum board, concrete masonry units, and wood.

1. Two top coats and one coat primer.
2. Top Coat(s): High Performance Architectural Interior Latex; MPI #140 and #143.
3. Top Coat Sheen:
   a. Satin: MPI gloss level 4; use this sheen at all locations unless otherwise indicated.
4. Primer: As recommended by top coat manufacturer for specific substrate.

B. Paint I-OP-MD-WC - "Interior Opaque Medium-Duty Wall/Ceiling" Vertical and Overhead: Including gypsum board, shop primed steel, and galvanized steel.
1. Applications include ducts, conduit, doors and frames, walls and ceilings of Spray Room.
2. Two top coats and one coat primer.
3. Top Coat(s): Interior Epoxy-Modified Latex; MPI #115 or 215.
4. Top Coat Sheen:
   a. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
5. Primer: As recommended by top coat manufacturer for specific substrate.

C. Paint I-TR-C - "Interior Transparent on Concrete".
1. Applications: Concrete floors and equipment pads.
2. 2 coats sealer.
3. Sealer: Water Based Sealer for Concrete Floors; MPI #99.
4. Sealer Sheen:
   a. Satin: MPI gloss level 4; use this sheen at all locations.

D. Paint CI-OP-2A - Concrete/Masonry, Opaque, Alkyd, 2 Coat: Exterior touch-up at CMU walls.
1. One coat of block filler.
2. Semi-gloss: One coat of alkyd enamel; [____].

2.04 **ACCESSORY MATERIALS**

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
B. Patching Material: Latex filler.
C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 **EXAMINATION**

A. Do not begin application of paints and finishes until substrates have been properly prepared.
B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
E. Test shop-applied primer for compatibility with subsequent cover materials.
F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
1. Gypsum Wallboard: 12 percent.
2. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
4. Concrete Floors and Traffic Surfaces: 8 percent.

3.02 **PREPARATION**

A. Clean surfaces thoroughly and correct defects prior to application.
B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
C. Remove or repair existing paints or finishes that exhibit surface defects.

D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
E. Seal surfaces that might cause bleed through or staining of topcoat.
F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
G. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
H. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.
I. Galvanized Surfaces:
   1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
   2. Prepare surface according to SSPC-SP 2.
J. Ferrous Metal:
   1. Solvent clean according to SSPC-SP 1.
   2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
   3. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.
K. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 **APPLICATION**

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
E. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
G. Sand wood and metal surfaces lightly between coats to achieve required finish.
H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.
J. Acoustic Decking: Do not allow paint to fill holes.

3.04 **FIELD QUALITY CONTROL**

A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection.

3.05 **CLEANING**

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 **PROTECTION**

A. Protect finishes until completion of project.
B. Touch-up damaged finishes after Substantial Completion.

3.07 **COLOR SCHEDULE**

A. Use attic stock from previous project to match existing roof colors, if available.

B. Manufacturer Basis of Design: Rodda

	PAINT SYSTEM	COLOR	SHEEN	LOCATIONS
	I-OP	Rodda "Whisper White"	Satin	General walls and ceilings, and as indicated.
	I-OP	Rodda "Grape Green"	Satin	Accent color on walls.
	I-OP-MD-WC	Rodda "Whisper White"	Semi-gloss	Spray Room walls and ceilings, Interior hollow metal frames and doors
	CI-OP-2A	Match Existing	Match Existing	Exterior touch up paint to match existing
	I-TR-C	Clear	Satin	Concrete floors.

END OF SECTION

SECTION 21 2400

DRY CHEMICAL FIRE EXTINGUISHING-SYSTEM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire suppression system.
B. Cylinder and valve assembly.
C. Manual release station.
D. Control equipment.
E. Distribution system.
F. Pipe and piping specialties.
G. Miscellaneous equipment.
H. System maintenance after closeout.

1.02 RELATED REQUIREMENTS

A. Section 26 2717 - Equipment Wiring: Electrical characteristics and wiring connections.
B. Section 28 3100 - Fire Detection and Alarm.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: To bear stamp of approval of Authority Having Jurisdiction. Provide for each piece of equipment comprising the system including valves, pressure gages, detectors, release devices, actuators, thermostats, discharge nozzles, manual controls, alarm devices, annunciators, extinguishing agent containers, manifolds, and control panel.
C. Shop Drawings: To bear stamp of approval of Authority Having Jurisdiction. Indicate detailed layout of system, including piping and location of each component. Include control diagrams, wiring diagrams, and written sequence of operation.
    1. Drawing Scale: 1/4 inch to 1 foot, minimum; use larger scale for details.
D. Design Data: Submit design calculations bearing stamp of approval of Authority Having Jurisdiction, Fire Marshal, Owner's fire insurance underwriter. Include calculations that verify system pressures, nozzle flow rate, orifice code numbers, piping pressure losses, component flow data, and pipe sizes. Base design approach on NFPA 17.
E. Installer's Qualification Statement.
F. Certificates: Certify that products meet or exceed specified requirements.
    1. Manufacturer: Certify that system meets or exceeds specified requirements.
G. Manufacturer's Instructions: Include recommended equipment installation and system components.
H. Test Reports: Indicate successful completion of tests; include certification of extinguishing agent container pressure and extinguishing agent quantity.
I. Code Authority Approval: Submit copy of inspection approval of fire protection system by Authority Having Jurisdiction.
J. Project Record Documents: Record actual locations of components and equipment, equipment identification markings, conduit and piping routing details, and agent container positions.

K. Operation and Maintenance Data:

1. Include electrical schematic written description of system design, drawings illustrating control logic and equipment locations, and technical brochures describing equipment.
2. Include list of recommended spare parts.
3. Include checklists and procedures for emergency situations, trouble shooting techniques, abort functions, system control panel operation, trouble procedures, and safety requirements.

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

1.05 **QUALITY ASSURANCE**

A. Designer Qualifications: Design system under direct supervision of a Professional Engineer experienced in design of this Work and licensed at Michigan.
B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
C. Provide products listed, classified, and labeled by ITS (DIR), UL (DIR), or testing firm acceptable to authorities having jurisdiction as suitable for the purpose indicated.

1.06 **DELIVERY, STORAGE, AND HANDLING**

A. Deliver and store equipment in shipping containers with labeling in place. Deliver fire extinguishing agent in approved containers.

1.07 **WARRANTY**

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

PART 2 PRODUCTS

2.01 **MANUFACTURERS**

A. System Components Other Than Pipe, Piping Specialties, Conduit, Wiring, and Wiring Devices:

1. Kidde Fire Systems, a UTC Company; Model IND: www.kiddefiresystems.com.
2. Tyco Fire Protection Products, a Tyco Business: www.tyco-fire.com.

B. Controls and Control Panels:

1. Kidde Fire Systems, a UTC Company; ARIES NETLink: www.kiddefiresystems.com.
2. Tyco Fire Protection Products, a Tyco Business: www.tyco-fire.com.

C. Alarm and Detection Systems:

1. Kidde Fire Systems, a UTC Company; AIR-Intelligence: www.kiddefiresystems.com.
2. Tyco Fire Protection Products, a Tyco Business: www.tyco-fire.com.

2.02 **FIRE SUPPRESSION SYSTEM**

A. Provide a pre-engineered modular type, fixed pipe, automatic dry chemical fire suppression system for the hazard including work area, plenums, and all associated ductwork, and paint spray booth.
B. System to consist of manufacturer's dry chemical storage cylinders, actuation hardware, distribution nozzles attached to the pipe network.
C. System to comply with NFPA 17, NFPA 33, and NFPA 34 including extinguishing agent.

2.03 **CYLINDER AND VALVE ASSEMBLY**

A. Provide steel cylinder and valve assemblies of the type and size required by the manufacturer for dry chemical storage.
B. Specialties to consist of valves and pressure gages, including reliable and safe means of minimizing accidental discharge.
C. Furnish pressurized assembly with the capability of being stored and operated at the following temperature ranges:
D. Provide listed bracketing for the mounting of the cylinder securely to the intended mounting surface.
E. Furnish manufacturer's high-pressure nitrogen tubing when control system is mounted to a dry cylinder and in all cases where actuation delay is employed.

2.04 **MANUAL RELEASE STATION**

A. Provide as a means of manually actuating the system from a remote location.
B. Surface housing fitted with un-tensioned pull-to-trip that locks in position after allowing the control system to activate the cylinder and valve assembly, for mounting on electrical outlet box; addressable using manufacturer's standard monitor module.
C. Functions:

1. Activate all audible and visual alarms.
2. Override any abort station or time delay function.
3. Activate all release and shutdown functions normally triggered by detectors or alarm system.

D. Identification:

1. Provide engraved label for each manual release station indicating area protected and that actuation will cause discharge of fire extinguishing agent.
2. Provide manufacturer's label directly on faceplate.

2.05 **CONTROL EQUIPMENT**

A. Provide control equipment capable of automatic and manual discharge of the dry chemical agent from all extinguishing valve assemblies, including automatic shutdown of the heat source or fuel and electrical power to all protected areas upon system activation.
B. Furnish fully enclosed, integral control head and actuator for each cylinder valve assembly without exposed means for actuation.

1. Control Head: Equip with micro-switch contacts for audible alarm and equipment shutdown.

C. All cylinders protecting one hazard area must be connected for simultaneous discharge by all methods of alarm actuation.
D. Activate control head automatically by electrical and mechanical means.

1. Provide listed, rate-compensated thermostat fire detectors conforming to NFPA 17, with rating suitable to their expected exposure temperature, capable of detecting and indicating heat, flame, smoke, combustible vapors, or an abnormal condition in the hazard that is likely to produce a fire.
2. Electrical Activation:

a. Activate electric solenoid by tested and listed system control panel.
b. Provide supervision for all detection and releasing circuits.
c. Furnish listed, rate-compensated thermostat fire detectors conforming to NFPA 17, with rating suitable to their expected exposure temperature, capable of detecting and

indicating heat, flame, smoke, combustible vapors, or an abnormal condition in the hazard that is likely to produce a fire.

d. Provide secondary, reserve power supply in accordance with NFPA 17, Chapter 9.6.1

3. Mechanical Activation:
4. Activate system control head by manufacturer supplied fire detectors incorporating mechanical thermo-bulb link systems requiring no outside power source for operation.

   a. Provide thermo-bulb links with rating suitable to their expected exposure temperature.

2.06 DISTRIBUTION SYSTEM

A. Discharge Nozzles:

1. Total-flooding type for enclosed spaces.
2. Duct/plenum type for exhaust ducts or plenums.
3. Identification: Permanently marked with manufacturer's identification system identifying nozzle type and listing.

B. Discharge Nozzles for Local Application:

1. High overhead type for discharge of solid cone of dry chemical on to protected area from above.
2. Identification: Permanently marked with manufacturer's identification system identifying nozzle type and listing.

C. Flow Restrictors: Designed and supplied by the extinguishing system manufacturer to restrict flow of dry chemical through the in-line distribution piping to ensure the appropriate quantity of agent is delivered to each nozzle in the distribution system.

2.07 PIPE AND PIPING SPECIALTIES

A. Steel Pipe: ASTM A53/A53M or ASTM A106/A106M Schedule 40, or ASTM A135/A135M Schedule 10, hot dipped galvanized.

1. Fittings: ASME B16.3 malleable iron class 300 for sizes 2 inch and smaller, or ASTM A234/A234M, wrought steel welding type fittings.
2. Joints: Threaded, AWS D1.1/D1.1M welded, or grooved and shouldered pipe end couplings.

B. Pipe Hangers: ASME B31.1, listed, split clamp up to 2-1/2 inch size, riser clamps over 2-1/2 inch size, adequate to offset discharge thrust.

C. Escutcheons: Chrome plated pressed or stamped brass, one-piece or split pattern, minimum 2 inches larger than opening.

D. Gages:

1. ASME B40.100, UL 393, or UL 404 3-1/2 inch diameter cast aluminum case, phosphor bronze bourdon tube, rotary brass movement, brass socket, front re-calibration adjustment, black figures on white background, 1 percent mid-scale accuracy, scale calibrated in psi.

2.08 MISCELLANEOUS EQUIPMENT

A. Alarm Bells: 24 volts, with supervision of circuit wiring, of modular design, red baked enamel finish, with minimum sound level of 84 dba at 10 feet, for mounting on 4 inch electrical outlet box.

B. Alarm Horns: 24 volts, with supervision of circuit wiring, with minimum sound level of 90 dba at 10 feet, for mounting on 4 inch electrical outlet box.

C. Strobe Beacon: Manufacturer's standard design, 24 volts, with system identification on strobe lens.

D. Signage:

1. Entrance Sign: One warning sign at each entrance to protected area.
2. Exit Warning Signs: One lighted, flashing warning sign at each exit from protected area.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that open, enclosed, and protected areas requiring total dry chemical flooding enable required application and concentration to be built up and maintained for the required time to ensure fire is extinguished.

3.02 INSTALLATION

A. Install in accordance with the Authority Having Jurisdiction, Fire Marshal, Owner's fire insurance underwriter, and manufacturer's instructions including the following NFPA Standards:

1. NFPA 17 and NFPA 33 for the extinguishing system.
2. NFPA 72 for the detection and alarm control units (other than links).
3. NFPA 70 for electrical connections.

B. Agent Distribution Piping:

1. Ream pipe and tube ends, remove burrs and bevel plain end ferrous pipe.
2. Remove scale and dirt on inside and outside before assembly.
3. Blow out pipe before nozzles or discharge devices are installed.
4. Route piping in orderly manner, concealed, plumb and parallel to building structure, and maintain gradient.
5. Install piping to conserve building space and not interfere with use of space and other work.
6. Securely support piping in accordance with ASME B31.1 with allowance for fire extinguishing agent thrust forces, and thermal expansion and contraction.
7. Use grooved mechanical couplings and fasteners only in accessible locations with roll grooved piping only.
8. Install unions downstream of valves and at equipment or apparatus connections.
9. Prepare pipe, fittings, supports, and accessories for finish painting, in accordance with Section 09 9123.
10. Identify in accordance with requirements of referenced standard.
    a. Place directional arrows and system labels wherever piping changes direction and minimum every 20 feet on straight runs.
    b. Install engraved plastic instruction plate, detailing emergency procedures, at control panel and at each manual discharge and abort switch location.
11. At control panel identify control logic units, contacts, and major circuits with permanent nameplates.
    a. Refer to Section 22 0553 for identification.

C. Manufactured Equipment for Field Installation:

1. Cylinder and valve assembly with listed mounting bracket.
2. Discharge adapter kit.
3. Pressure switches where applicable.
4. Discharge nozzles.

5. Actuation System Installation:
    a. Mount the housed control system where indicated on the drawings.
    b. Install the system valve actuators, cylinders, and nitrogen actuation tubing.
6. Mechanical/Electrical Actuation:
    a. Install fusible links, cabling, heat detectors, and UL (DIR) listed fire control panel.
    b. Locate thermo-bulb links in accordance with manufacturer's instructions and as acceptable to the authority having jurisdiction.
    c. Install remote manual release pull station.
    d. Mount electrical actuator within control system housing.
    e. Attach, mount, and wire all micro-switches.

D. Install wiring in accordance with Section 26 2717 requirements.
E. Make final connections between equipment and system wiring under direct supervision of factory trained representative of manufacturer.
F. Penetrations:
    1. At hazard area walls pack space between pipe, pipe sleeve or surface penetration with mineral fiber with elastomer calk to depth of 1/2 inch.
    2. Provide escutcheons where exposed piping passes through walls, floors, and ceilings.
    3. Seal pipe penetrations of fire separations.
    4. Refer to Section 07 8400.
G. Locate remote manual releases and abort switches at one or more doors to protected area.
H. Locate strobe units at all points of entrance to protected area.

3.03 INTERFACE WITH OTHER PRODUCTS

~~A. Provide interlock with automatic closing door releases. Refer to Section 08 7100.~~
~~B.~~**A.** Provide signal to building fire alarm system. ~~Refer to Section 28 3100.~~

3.04 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.
B. Perform field inspection and testing in accordance with Section 01 4000 - Quality Requirements.
C. Pressure Testing:
    1. Test distribution piping and valving, prior to nozzle installation, with air pressure test at levels recommended by the manufacturer.
    2. Inspect joints using soap water solution or halide torch or lamp.
    3. Repair leaks and retest.
    4. Maintain test pressure for four hours.
D. Upon completion of installation provide final checkout inspection by factory trained representative of manufacturer to ascertain proper system operation.
E. Leave system in a fully commissioned and automatic readiness state with circuitry energized and supervised.
F. Test circuits including automatic discharge, manual discharge, equipment shut-down, alarm devices, storage container pressure, and supervision of each circuit.
G. Check each detector in accordance with manufacturer's instructions, perform any required adjustments, and include record of work in test report.
H. Submit original copies of tests, indicating that factory trained technical representatives of the manufacturer have inspected and tested systems and are satisfied with methods of installation, connections and operation.

I. Where applicable, pressure test enclosed, protected space with test fan, pressurizing protected area both under positive and negative conditions. Confirm that leakage is within system design allowance.

3.05 **CLOSEOUT ACTIVITIES**

A. See Section 01 7800 - Closeout Submittals, for closeout submittals.
B. See Section 01 7900 - Demonstration and Training, for additional requirements.
C. Demonstration and Instructions:
    1. Demonstrate that components, except discharge assemblies, are functioning properly and in conjunction with controls system.
    2. Submit integrated step-by-step test procedure for approval 30 days prior to start of demonstration.
        a. Arrange meeting prior to demonstration with representatives of Owner, Owner's underwriter, and the installer.
        b. Perform visual inspection and overall review of system installed.
        c. Place minimum of three UL-listed recording analyzers in space.
        d. Provide certification that testing devices have been checked by a recognized testing authority within two weeks of date of demonstration.
        e. When applicable, certify that replacement charge can be provided within 24 hours of demonstration.
D. Training: Train Owner's personnel on operation and maintenance of system.
    1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
    2. Provide minimum of two hours of training.

3.06 **MAINTENANCE**

A. Conduct inspections at six months and 12 months from Date of Substantial Completion to verify proper operation of system, check agent container weight and pressure, and a thorough check of controls, detection and alarm systems.
B. Remedy of all deficiencies shall be included at no extra cost to Owner except for replacement of agent due to discharge under normal use or damage due to abuse.
C. Submit documents certifying satisfactory system conditions and include manufacturer's certificate of acceptance of inspector's qualifications.

END OF SECTION

SECTION 22 0500

COMMON WORK RESULTS FOR PLUMBING

PART 1 GENERAL

1.01 SUMMARY

A. The intent of Division 22, Plumbing and the accompanying Drawings is to provide a complete and workable facility with complete systems as shown, specified and required by applicable codes. Include all work specified in Division 22, Plumbing and shown on the accompanying Drawings, including appurtenances, connections, etc., in the finished job.

B. Division 22, Plumbing and the accompanying Drawings are complementary and as binding as if called for by both. Items shown on the Drawings are not necessarily included in the Specifications and vice versa. Specifications supersede drawings in case of conflict.

C. The Drawings that accompany the Division 22, Plumbing, are diagrammatic. They do not show every offset, bend, tee, or elbow which may be required to install work in the space provided and avoid conflicts. Offsets and transitions assumed at a minimum at each duct crossing, structural penetrations through shear walls or beams, structural grids where ceiling heights are restricted, and at piping mains. Follow the Drawing as closely as is practical to do so and install additional bends, offsets and elbows where required by local conditions from measurements taken at the Building, subject to approval, and without additional cost to the Owner. The right is reserved to make any reasonable changes in fixture location prior to roughing-in, without cost impact.

D. The General and Supplemental Conditions apply to this Division, including but not limited to:

1. Drawings and specifications.
2. Public ordinances, permits.
3. Include payments and fees required by governing authorities for work of this Division.

1.02 RELATED SECTION

A. Division 01, General Requirements

B. Division 22, Plumbing

1.03 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Products and equipment prohibited from containing pentabrominated, octabrominated and decabrominated diphenyl ethers. Where products or equipment within this specification contain these banned substances, provide complying products and equipment from approved manufacturers with equal performance characteristics.
2. General:
    a. Conform work and materials to local and State codes, and Federal, State and other applicable laws and regulations.
3. Responsible for obtaining and payment for permits, licenses, and inspection certificates required in accordance with provisions of Contract Documents.

B. New materials and equipment. Work of good quality, free of faults and defects and in conformance with the Contract Documents.

C. Build and install apparatus to deliver its full rated capacity at the efficiency for which it was designed.

D. Operate the entire plumbing system and apparatus at full capacity without objectionable noise or vibration.

E. Materials and Equipment:

1. Meet detailed requirements of the Drawings and Specifications and suitable for the installation shown. Equipment not meeting requirements will not be acceptable, even though specified by name along with other manufacturers.
2. Where two or more units of the same class of equipment are furnished, use products of the same manufacturer. Component parts of the entire system need not be products of same manufacturer.
3. Furnish materials and equipment of size, make, type, and quality herein specified.
4. Equipment scheduled by performance or model number considered the basis of the design. If other specified manufacturer's equipment is provided in lieu of the basis of design equipment the contractor is responsible for changes and costs which may be necessary to accommodate this equipment, including different sizes and locations for connections, different electrical characteristics, different dimensions, different access requirements or any other differences which impact the project.

F. Workmanship:

1. General:

a. Install materials in a neat and professional manner.

2. Manufacturer’s Instructions:

a. Follow manufacturer’s directions where they cover points not specifically indicated.
b. If in conflict with the Drawings and Division 22, Plumbing, obtain clarification before starting work.

G. Cutting and Patching:

1. Cutting, patching, and repairing for the proper installation and completion of the work specified in this Division including plastering, masonry work, concrete work, carpentry work, and painting performed by skilled craftsmen of each respective trade in conformance with the appropriate Division of Work.
2. Additional openings required in building construction made by drilling or cutting. Use of jackhammer is specifically prohibited.
3. Fill holes which are cut oversize so that a tight fit is obtained around the sleeves passing through.
4. Do not pierce beams or columns without permission of Architect and then only as directed.
5. Restore new or existing work cut or damaged to its original condition.

1.04 SUBMITTALS

A. Product Data:

1. Submit product data for review on scheduled pieces of equipment, on equipment requiring electrical connections or connections by other trades, and as required by each specification section or by Drawing notes. Include manufacturer’s detailed shop drawings, specifications and data sheets. Data includes the following:

a. Capacities
b. RPM
c. BHP
d. Pressure Drop
e. Design and Operating Pressures

f. Temperatures

2. Manufacturer's abbreviations or codes are not acceptable.
3. List the name of the motor manufacturer and service factor for each piece of equipment.
4. Indicate equipment operating weights including bases and weight distribution at support points.
5. In the case of equipment such as wiring devices, time switches, valves, etc., specified by specific catalog number, a statement of conformance will suffice.

B. Submission Requirements:

1. Product Data:

a. Refer to Division 01, General Requirements for additional requirements related to submittals.
b. Submit electronic copies of product data for Work of Division 22, Plumbing in PDF format with each item filed under a folder and labeled with its respective specification section number, article, and paragraph and mark, if applicable.
c. Include a complete index in the original submittal. Indicate both original items submitted and note stragglers that will be submitted at a later date to avoid delay in submitting.

C. Contractor Responsibilities:

1. Submit submittals at one time and are in proper order.
2. Ensure equipment will fit in the space provided.
3. Assure that deviations from Drawings and Specifications are specifically noted in the submittals. Failure to comply will void review automatically.

1.05 **AS-BUILT DRAWINGS**

A. Provide record drawings in hard copy and pdf format. Drawings include the following:

1. Project specific titleblock.
2. Notations reflecting the as built conditions of any additions to or variations from the construction documents provided as part of the BIM coordination, RFIs, ASIs, Owner Changes, and Field Coordination.

1.06 **OPERATING AND MAINTENANCE MANUAL, PARTS LISTS, AND OWNER'S INSTRUCTIONS**

A. Refer to Division 01, General Requirements for additional requirements.
B. Submit three bound copies of manufacturer's operation and maintenance instruction manuals and parts lists for each piece of equipment or item requiring servicing. Show literature on 8-1/2-inches by 11-inches sheets or catalogs suitable for side binding.
C. Submit data when the work is substantially complete, packaged separately, and clearly identified in durable 3-ring binder. Include name and contact information for location of source parts and service for each piece of equipment.
D. Clearly mark and label in each submittal, the piece of equipment provided with the proper nameplate and model number identified. Provide wiring diagrams for electrically powered equipment.
E. Instruct Owner thoroughly in proper operation of equipment and systems, in accordance with manufacturer's instruction manuals. Operating instructions cover all phases of control.
F. Furnish competent engineer knowledgeable in this building system for minimum of one 4 hour period to instruct Owner in operation and maintenance of systems and equipment.

1.07 **PROJECT CONDITIONS**

A. Existing Conditions:

1. Prior to bidding, verify and become familiar with existing conditions by visiting the site, and include factors which may affect the execution of this Work.
2. Include related costs in the initial bid proposal.

B. Coordinate exact requirements governed by actual job conditions. Check information and report any discrepancies before fabricating work. Report changes in time to avoid unnecessary work.

C. Coordinate shutdown and start-up of existing, temporary, and new systems and utilities. Notify Owner, City, and Utility Company.

1.08 **WARRANTY**

A. Provide a written guaranty covering the work of this Division (for a period of one calendar year from the date of acceptance by the Owner) as required by the General Conditions.

B. Provide manufacturer's written warranties for material and equipment furnished under this Division insuring parts and labor for a period of one year from the date of Owner acceptance of Work of this Division.

C. Correct warranty items promptly upon notification.

1.09 **PROVISIONS FOR LARGE EQUIPMENT**

A. Make provisions for the necessary openings in building to allow for admittance of equipment.

1.10 **TEST REPORTS AND CERTIFICATES**

A. Submit one copy of test reports and certificates specified herein to the Architect.

1.11 **SUBSTITUTIONS**

A. Submit requests for product substitutions in accordance with the Instructions to Bidders and the General and Supplemental Conditions.

PART 2 PRODUCTS

2.01 **PIPE SLEEVES**

A. Interior Wall and Floor Sleeves: 18 gauge galvanized steel, or another pre-approved system.

B. Interior Wall and Floor Sleeves, Fire Rated: Fire rated and water tight system approved by Authority Having Jurisdiction and Owners Insurance underwriter, with rating equal to floor or wall penetration, and designed specifically for the floor or wall construction, piping material, size and service.

C. Exterior Wall Sleeves: Cast iron.

D. On Grade Floor Sleeves: Same as exterior wall sleeves.

E. Water Tight Sleeves: Combination steel pipe sleeves with water stop and anchor plate; Link Seal Model WS, mated with synthetic rubber links interlocked with bolts and nuts; Link Seal Model LS.

2.02 **FLOOR, WALL AND CEILING PLATES**

A. Furnish stamped split type plates as follows:

1. Floor Plates: Cast brass, chromium plated
2. Wall and Ceiling Plates: Spun aluminum

2.03 **MACHINERY GUARDS**

A. Furnish guards for protection on rotating and moving parts of equipment. Provide guards for metal fan drives and motor pulleys, regardless of being enclosed in a metal cabinet.

B. Design guards so as not to restrict airflow at fan inlets resulting in reduced capacity.
C. Provide shaft holes in guards for easy use of tachometers at pulley centers. Easily removable for pulley adjustment or removal and changing of belts.
D. Meet OSHA requirements including back plates.
E. Provide inlet and outlet screens on fans in plenums or where exposed to personnel.

2.04 **ELECTRICAL EQUIPMENT**

A. General:

1. Equipment and installed work as specified under Division 26, Electrical.

B. Coordinate with the electrical Drawings and electrical contractor for minimum electrical equipment bracing requirements based on the available interrupting current (AIC) rating at the bus of the panelboard or switchboard serving the piece of equipment. Provide equipment that meets the bracing requirement.
C. Starters: Provided under Division 26, Electrical, suitable for performing the control functions required, with the exception of self-contained equipment and where the starters are furnished as part of the control package.
D. Equipment Wiring:

1. Provide interconnecting wiring within or on a piece of mechanical equipment with the equipment unless shown otherwise. This does not include the wiring of motors, starters and controllers provided under Division 26, Electrical.

E. Control Wiring: Provide control wiring for plumbing equipment
F. Codes: Electrical equipment and products bear the Underwriters label as required by governing codes and ordinances.

PART 3 EXECUTION

3.01 **SLEEVES**

A. Interior Floor and Wall Sleeves:

1. Provide sleeves large enough to provide 3/4-inch clearances around pipe.
2. Where pipe is insulated, provide sleeves large enough to provide 3/4-inch clearance around insulation. Maintain continuous insulation as it passes through sleeve.
3. Penetrations through mechanical room and fan room floors made watertight by packing with safing insulation and sealing with Tremco Dymeric Sealant or approved system.

B. Sleeves Through Rated Floors and Walls:

1. Similar to interior sleeves except install fire rated system approved by Authority Having Jurisdiction and Owners insurance underwriter
2. Rating equal to floor or wall penetration, and designed specifically for the floor or wall construction, piping material, size and service.

C. Exterior Wall Sleeves Below Grade:

1. Provide water tight sleeves. Install at pipes entering building below grade and where shown. Adjust to provide positive hydrostatic seal.
2. Responsible for following manufacturer's procedure for installing and tightening seal. Secure sleeves against displacement.

D. On Grade Floor Sleeves: Same as below grade exterior wall sleeves, caulked from inside.
E. Exterior Wall Sleeves Above Grade: Similar to interior wall sleeves except caulk outside with Tremco Dymeric Sealant.

F. Layout work prior to concrete forming. Do cutting and patching required. Reinforce sleeves to prevent collapse during forming and pouring.
G. Floor sleeves maintain a water barrier by providing a water tight seal or they extend 1-inch above finished floor except through mechanical equipment room floors and shafts where sleeves extend 2-inches above finished floor level. Sleeves through roof extend 8-inches above roof. Wall sleeves flush with face of wall unless otherwise indicated. Waste stacks using carriers have sleeves flush with floor and sealed. Sleeves through planters extend 8-inches above planter base.
H. Do not support pipes by resting pipe clamps on floor sleeves. Provide supplementary members so pipes are floor supported.
I. Special sleeves detailed on drawings take precedence over this Section.

3.02 **CLEANING**

A. General: Clean plumbing equipment, fixtures and piping of stampings and markings (except those required by codes), iron cuttings, and other refuse.
B. Painted Surfaces: Clean scratched or marred painted surfaces of rust or other foreign matter and paint with matching color industrial enamel, except as otherwise noted.
C. Additional requirements are specified under specific Sections of this Division.

3.03 **EQUIPMENT PROTECTION**

A. Keep pipe and conduit openings closed by means of plugs or caps to prevent the entrance of foreign matter. Protect piping, conduit, fixtures, equipment, and apparatus against dirty water, chemical or mechanical damage both before and after installation. Restore damaged or contaminated fixtures, equipment, or apparatus to original conditions or replace at no cost to the Owner.
B. Protect bright finished shafts, bearing housings, and similar items until in service. No rust will be permitted.
C. Cover or otherwise suitably protect equipment and materials stored on the job site.

3.04 **ACCESSIBILITY**

A. General: Locate valves, cleanout fittings and other indicating equipment or specialties requiring frequent reading, adjustments, inspection, repairs, and removal or replacement conveniently and accessibly with reference to the finished building.
B. Gauges: Install gauges so as to be easily read from the floors, platforms, and walkways.

3.05 **FLOOR, WALL AND CEILING PLATES**

A. Install on piping passing through finished walls, floors, ceilings, partitions, and plaster furrings. Plates completely cover opening around pipe.
B. Secure wall and ceiling plates to pipe, insulation, or structure.
C. Plates not to penetrate insulation vapor barriers.
D. Plates not required in mechanical rooms or unfinished spaces.

3.06 **ADJUSTING AND CLEANING**

A. Before operating any equipment or systems, make thorough check to determine that systems have been flushed and cleaned as required and equipment has been properly installed, lubricated, and serviced. Check factory instructions to see that installations made accordingly and that recommended lubricants have been used.
B. Use particular care in lubricating bearings to avoid damage by overlubrication and blowing out seals. Check equipment for damage that may have occurred during shipment, after delivery, or during installation. Repair damaged equipment as approved or replace with new equipment.

3.07 **ELECTRICAL EQUIPMENT**

A. Do not install piping for plumbing systems not serving electrical space in switchgear room, transformer vault, telephone room, or electric closet except as indicated.

B. Piping for plumbing systems not to pass over switchboards or electrical panelboards. Where conflicts exist, bring to attention of Architect.

3.08 **EQUIPMENT CONNECTIONS**

A. Make final connections to equipment specified in sections other than Division 22, Plumbing of the specifications and Owner furnished equipment in accordance with manufacturer's instructions and shop drawings furnished and as indicated.

B. Piping:

1. Connections include cold water, natural gas, compressed air.
2. Provide valves and specialties as specified and as detailed on the Drawings. Provide increasers, reducers, and any other fittings required for complete installation.
3. Independently support piping connections to prevent undue strain on equipment.

END OF SECTION

SECTION 22 0523

GENERAL DUTY VALVES AND SPECIALTIES FOR PLUMBING

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. Ball Valves
2. Specialty Valves
3. System Specialties
4. Strainers

1.02 RELATED SECTIONS

A. Division 01, General Requirements
B. Division 22, Plumbing

1.03 SUBMITTALS

A. Submit product data.

1.04 DEFINITIONS

A. CWP Cold working pressure
B. EPDM Ethylene propylene copolymer rubber
C. NBR Acrylonitrile-butadiene, Buna-N, or nitrile rubber
D. NRS Nonrising stem
E. OS&Y Outside screw and yoke
F. RS Rising stem
G. PTFE Polytetrafluoroethylene plastic
H. SWP Steam working pressure
I. Lead Free Section 1417 of the Safe Drinking Water Act (SDWA) establishes the definition for lead free as a weighted average of 0.25 percent lead calculated across the wetted surfaces of a pipe, pipe fitting, plumbing fitting, and fixture and 0.2 percent lead for solder and flux. The Act provides a methodology for calculating the weighted average of wetted surfaces.

1.05 QUALITY ASSURANCE

A. ASME Compliance:

1. ASME B16.10 for ferrous valve dimensions.
2. ASME B31.9 for building services piping valves.

B. NSF Compliance: NSF/ANSI 61 and/or NSF/ANSI 372 for valve materials for potable-water service. ANSI/NSF-359

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. General: Where only NIBCO figure numbers are listed, equivalent products by those specified below are acceptable.

1. Valves:

a. Ball:

1) Gruvlok
2) Apollo

3) Crane
4) Hammond
5) Milwaukee
6) Victaulic

2. Specialty Valves:

a. Gas Cock:

1) Wooster
2) Parker
3) Watts
4) Jamesbury
5) PGL
6) ASCO

b. Gas Pressure Regulator:

1) Actaris
2) Maxitrol
3) Fisher
4) Other Manufacturers: Submit substitution request.

B. Other Manufacturers: Submit substitution request.
C. Use only one manufacturer.
D. Valve ends may be threaded or soldered, as applicable to piping system. Refer to Section 22 21 13, Pipe and Pipe Fittings Plumbing for allowable fittings.

2.02 **BALL VALVES**

A. Bronze Ball: Bronze cast body, chrome-plated full port ball, with handle, Teflon seat, 600 psi WOG, 150 psi steam; NIBCO 585-80.
B. Lead Free Bronze Ball: Two piece, full port, lead free silicon bronze body, Stainless steel or silicon bronze trim, Reinforced PTFE or TFE seats, 600 psi CWP NIBCO T/S-585-80-LF or T/S-585-66-LF.

2.03 **SPECIALTY VALVES**

A. Gas Cock:

1. Forged brass body, hard chromium plated forged brass ball, with handle, rubber seats meeting ASTM D471, 175 psi WOG.
2. Test entire unit latest version of ANSI Z21.15, AGA, and UL listed.

B. Drain Valves: Bronze globe valve or full port ball valve, garden hose end, cap, and chain 3/4-inch size.
C. Gas Pressure Regulator:

1. 0-500 SCFH capacity at 0-14 inches outlet pressure.
2. Body: Cast iron complying with ANSI 125 pound construction standard.
3. Orifice: Aluminum
4. Valve Seat: BUNA-N
5. Diaphragm: BUNA-N
6. Internal relief valve

a. Vent limiting device
b. Maxitrol 325 series

2.04 **STRAINERS**

A. Manufacturers:

1. General:

a. Armstrong
b. McAlear
c. Sarco
d. Steamflo
e. Mueller
f. R.P. & C. Company Titan Flow Control

2. Other Manufacturers: Submit substitution request.

B. Wye Pattern:

1. Bronze: Bronze body, 250 psi, 1/16-inch perforated type 304 stainless screen.

PART 3 EXECUTION

3.01 **INSTALLATION**

A. Provide valves at connections to equipment where shown or required for equipment isolation.
B. Provide separate support for valves where necessary.
C. Provide drain valves in low points in the piping system, at coils and equipment, and as indicated.
D. Coordinate gas pressure regulator selection with inlet pressure available at the regulator and the capacity and outlet pressure required by the equipment served.
E. Install in accordance with manufacturer's recommendations.
F. Locate gas cocks and gas regulator readily accessible for servicing.
G. Provide approved gas cock immediately upstream of each gas pressure regulator.

3.02 **APPLIED LOCATIONS PLUMBING VALVES**

A. In piping 2-inches and smaller:

System	Valve Types				
	Gate	Globe	Swing Check	Ball	Butterfly
Domestic Cold	NA	NA	NA	Lead Free Bronze	Not Allowed
Industrial Cold Water	NA	NA	NA	Bronze	Not Allowed
Compressed Air	NA	NA	NA	Bronze	Not Allowed

B. Natural Gas Piping:

1. Gas Cock
2. Gas Pressure Regulator

C. Provide gauge cock for all pressure gauges.

3.03 **INSTALLATION**

A. Strainer:

1. Applied Locations Plumbing:

a. Bronze wye, in piping 2-inch and smaller; industrial cold water.

END OF SECTION

SECTION 22 0529

HANGERS SUPPORTS AND ANCHORS FOR PLUMBING

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. Supports and Anchorage
2. Pipe Attachments
3. Insulation Protection Shields
4. Building Attachments

1.02 RELATED SECTIONS

A. Division 01, General Requirements
B. Division 22, Plumbing
C. Section 22 07 00, Insulation for Plumbing
D. Section 22 21 13, Pipe and Pipe Fittings Plumbing

1.03 SUBMITTALS

A. Submit the following:

1. Shop Drawings of contractor fabricated piping support structures.
2. No other submittals required under this section.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Supports, Anchorage and Restraint:

1. Unistrut
2. Superstrut
3. Powerstrut and Kinline
4. B-Line Systems
5. AnvilStrut

B. Pipe Attachments:

1. Anvil
2. Superstrut
3. B-Line Systems
4. Tolco
5. ERICO

C. Insulation Protection Shields:

1. Anvil or equivalent
2. Super Strut
3. B-Line Systems
4. Tolco
5. ERICO

D. Building Attachments:

1. Anvil as listed or equivalent products
2. Elcen

3. Superstrut
4. B-Line Systems
5. Tolco
6. ERICO

2.02 **SUPPORTS AND ANCHORAGE**

A. General:

1. Provide pipe and equipment hangers and supports in accordance with the following:

a. Equipment and supports for conduit and piping are not shown on the Drawings, the contractor responsible for their design.
b. Connections to structural framing not to introduce twisting, torsion, or lateral bending in the framing members.
c. In accordance with the applicable code.

B. Fabricate support members from welded standard structural shapes, pipe, and plate to carry the necessary rollers, hangers, and accessories as required.
C. Support piping less than 4-inch pipe size from or by prefabricated roll-formed channels with necessary accessories to adequately support piping system.
D. Supports and Accessories: Preformed roll-formed channels and accessories with matching compatible accessories as shown, as specified, and as required.
E. Dissimilar Metal Protection: Hydra-Zorb cushions or Cush-a-strip.
F. Clamps: Super Strut Series 700 through 702 or AnvilStrut Series 1000 through 1200.

2.03 **PIPE ATTACHMENTS**

A. Uninsulated Horizontal Copper Piping:

1. 2-inch and Smaller: Anvil CT-65, CT-69, CT-99C.

B. Insulated Horizontal Copper Pipe with Hangers Inside of Insulation: Same as Uninsulated Horizontal Copper Pipe.
C. Insulated Horizontal Copper Pipe with Hangers Outside of Insulation:

1. 2-inch and Smaller: Anvil 65, 70, 104 or 260.

D. Other Uninsulated Horizontal Pipe:

1. 2-inch and Smaller: Anvil 65, 70, 104 or 260.

2.04 **INSULATION PROTECTION SHIELDS**

A. Insulation Protection Shields: Anvil 167

2.05 **BUILDING ATTACHMENTS**

A. Beam Hangers:

1. On piping 6-inch and smaller: Anvil 86 with retaining clip Figure 89.
2. On piping larger than 6-inch: Anvil 228, or 292.

B. Inserts:

1. Anvil 152 malleable iron or 281 steel inserts.
2. Inserts sized for required rod to support load being carried.

C. Expansion Plugs: Similar and equal to Phillips red-head self-drilling flush shell selected for safety factor of 4.
D. Powder actuated fasteners with silencers as approved by Architect.

PART 3 EXECUTION

3.01 HANGERS AND SUPPORTS

A. General:

1. Install support systems as detailed and in accordance with manufacturer's recommendations. .
2. Provide adjustable hangers for pipes complete with inserts, adjusters, bolts, nuts, swivels, all-thread rods, etc., except where specified otherwise.
3. Except as otherwise indicated for exposed continuous pipe runs, install hangers, and supports of same type and style as installed for adjacent similar piping.
4. Support piping within 2-feet of each change of direction on both sides of fitting.

B. Insulated Piping Systems:

1. Refer to Section 22 07 00, Insulation for Plumbing for insulation requirements.
2. Insulated Piping Systems with Vapor Barrier Insulation:
   a. Install hangers outside of insulation.
3. Insulation Protection:
   a. Band insulation protection shields firmly to insulation to prevent slippage.

C. Horizontal Piping:

1. Support Spacing:
   a. Provide support at minimum spacing per MSS SP-69-1996 Pipe Hangers and Supports - Selection and Application:
      1) Support piping within 2-feet of each change in direction.
      2) Steel Pipe, Copper Tubing:

Minimum Pipe Size	Maximum Span Steel	Maximum Span Copper	Maximum Span Pex A pipe with Pex a Pipe Channel	Rod Size
1-inch and smaller	7-feet	5-feet	6-feet	1/4-inch
1-1/4-inch to 2-inch	8-feet	8-feet	8-feet	3/8-inch

      3) Fuel Gas Piping: Support in accordance with local code requirements.
      4) Plumbing Piping: Support in accordance with local plumbing code.

D. Building Attachments:

1. Fastening or attaching to steel deck (without concrete fill) is prohibited. It will be necessary to support piping from structural members, beams, joists, or provide intermediate angle iron supporting members between joists. Supports may be attached to concrete filled steel deck with load limitations shown on the structural drawings or otherwise obtained from the structural engineer.
2. Provide additional structural steel angles, channels, or other members required to support piping where structures do not occur as required for proper support.
3. Arrange supports to prevent eccentric loading of joists and joist girders. Locate supports at joist panel points.

END OF SECTION

SECTION 22 0590

PRESSURE TESTING FOR PLUMBING SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. Pressure Testing of Piping System

1.02 RELATED SECTIONS

A. Division 01, General Requirements
B. Division 22, Plumbing

1.03 QUALITY ASSURANCE

A. Code Compliance: Perform required tests in the presence of the authority having jurisdiction.
B. Owner Witness: Perform all tests in the presence of the Owner's representative.
C. Engineer Witness: The Engineer or Engineer's representative reserves the right to observe all tests or selected tests to assure compliance with the specifications.
D. Simultaneous Testing: Test observations by the authority having jurisdiction, the Owner's Representative, and the Engineer's representative need not occur simultaneously.

1.04 SUBMITTALS

A. Submit the following test reports:

1. Certificate of completion, inspection, and test by authority having jurisdiction on required piping systems.
2. Certificate of test approval by Owner's representative on all systems.
3. Engineer's representative will record witnessed tests.

PART 2 PRODUCTS – NOT APPLICABLE

PART 3 EXECUTION

3.01 GENERAL

A. Piping:

1. Test prior to concealment, insulation being applied, and connection to equipment, fixtures, or specialties.
2. Conduct tests with all valves but those used to isolate the test section 10 percent closed.

B. Leaks: Repair leaks and retest until stipulated results are achieved.
C. Notification:

1. Advise the Construction Manager 72 hours in advance of each test.
2. Failure to so notify will require test to be rescheduled.

D. Testing Equipment: Provide all necessary pumps, gauges, connections, and similar items required to perform the tests.

3.02 TESTING REQUIREMENTS

A. Domestic Water Systems:

1. Test entire system by closing all openings in piping except highest opening and filling system with water to point of overflow.
2. Keep water in system under test for a minimum of 45 minutes before inspection starts.

3. Test at full working pressure for 2 hours with no drop allowed. Locate and repair leaks.

B. Piping - General:

1. Test piping as noted below, with no leaks or loss in pressure for time indicated.
2. Repair or replace defective piping until tests are completed successfully:

Plumbing Systems	Test Pressure	Test Medium	Test Duration
Industrial water	150 psig	Water	4 hours
Natural gas piping	60 psig	Air	4 hours

END OF SECTION

SECTION 22 0700

INSULATION FOR PLUMBING

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. Pipe Insulation
2. Accessories Piping

1.02 RELATED SECTIONS

A. Division 01, General Requirements
B. Division 22, Plumbing
C. Section 22 05 29, Hangers, Supports and Anchors for Plumbing

1.03 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Insulating products prohibited from containing pentabrominated, octabrominated and decabrominated diphenyl ethers. Where products within this specification contain these banned substances, provide complying products from approved manufacturers with equal performance characteristics.
2. Flame and Smoke Ratings: Installed composite flame spread not to exceed 25 and smoke developed not to exceed 50 as tested by UL 723 or ASTM E84.
3. Energy Codes: Local Building and Energy Codes govern where insulation performance requirements for thickness exceeds thickness specified.

B. Protection: Protect against dirt, water, chemical, or mechanical damage before, during, and after installation. Repair or replace damaged insulation at no additional cost.

C. Source Quality Control:

1. Service: Use insulation specifically manufactured for service specified.
2. Labeling: Insulation labeled or stamped with brand name and number.
3. Insulation and accessories not to provide nutritional or bodily use to fungi, bacteria, insects, rats, mice, or other vermin. Asbestos free and no interaction with corrosively with equipment, piping, or ductwork.

1.04 SUBMITTALS

A. Submit the following.

1. Product Data: For each type including density, conductivity, thickness, jacket, vapor barrier, and flame spread and smoke developed indices.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. General:

1. Johns Manville
2. Knauf
3. Owens Corning
4. CertainTeed
5. Such insulation by one manufacturer.
6. Other Manufacturers: Submit substitution request.

B. Pipe Insulation:

1. Fiberglass:

a. Johns Manville Microlok HP

2.02 **PIPE INSULATION**

A. Fiberglass: Split sectional or Snap-On type with 0.23 per inch maximum thermal conductivity (K-factor) at 75 degrees F mean temperature, 850 degrees F maximum service rating and white, vapor barrier jacket with pressure sensitive closure system.

2.03 **ACCESSORIES PIPING**

A. Adhesives:

1. General: Maximum Flame Spread/Smoke Developed Rating of 25/50, SCAQMD Rule 1168 compliant.
2. Fiberglass: Integral closure system.

B. Cements:

1. Insulating: Ryder.
2. Heat Transfer: Chemax Tracit-300.

C. Pipe Fitting Covers:

1. One piece PVC insulated pipe fitting covers.
2. Zeston, Ceel-Co.

D. Cloth Facing: Presized fiberglass cloth.

E. Tapes:

1. Pressure sensitive, weather resistant, and for temperatures up to 150 degrees F.
2. Zeston Z-tape.

PART 3 EXECUTION

3.01 **GENERAL**

A. Workmanship:

1. Installation: Insulation installed in first class, neat professional manner.
2. Applicators: Employed by firm that specializes in insulation work.

B. Preparation: Surfaces of piping and equipment clean, free of oil or dirt, and dry before insulation is applied.

C. Stamps: ASME stamps, UL labels, and similar stamps and labels are not covered.

3.02 **PLUMBING PIPE INSULATION APPLIED LOCATIONS**

A. Insulation Applied Locations – Plumbing Piping:

System	Pipe Size	Insulation Type	Insulation Thickness	Notes
Domestic Cold Water, Above Grade	1-1/4-inch and smaller	Fiberglass	1-inch	
Industrial Cold Water, Above Grade	1-1/4-inch and smaller	Fiberglass	1-inch	

B. The following piping is not insulated:

1. Natural Gas

C. Insulation include the following:

1. Fittings

2. Valve Bodies
3. Valve Bonnets
4. Piping through Sleeves except Valve Bonnets

3.03 **PIPING INSTALLATION**

A. General:

1. Joints: Coat both sides of complete joining area with applicable adhesive.
    a. Longitudinal Joints: Make joints on top or back of pipe to minimize visibility. Except foam plastic, seal with closure system or 3-inch wide tape.
    b. Butt Joints: Butt lightly together and, except for foam plastic, seal with 3-inch wide tape or butt straps.
    c. Multiple Layered Insulation: Joints staggered.
2. Access: Strainer and other items requiring service or maintenance with easily removable and replaceable section of insulation to provide access.
3. Voids:
    a. Fill voids, chipped corners and other openings with insulating cement or material compatible with insulating material.
4. Seal joints, seams, and fittings of metal watertight jackets at exterior locations.

B. Fiberglass Insulation: Exterior insulation encased in metal jacket.

C. Fittings: Insulation specified with continuous vapor barrier, the vapor barrier must not be violated.

1. In Other Insulation: Fittings covered with insulation to the same level of the adjoining insulation or fill with insulating cement. Finish with pipe fitting covers or cloth facing and tape.

D. Unions, Valves, Etc.:

1. General:
    a. As specified for fittings.
    b. Minimum thickness same as specified for piping.

E. Vapor Barrier Insulation:

1. Refer to Section 22 05 29, Hangers, Supports, and Anchors for Plumbing for support requirements.
2. Piping which requires vapor barrier protection of continuous vapor barrier, which may not be pierced or broken. The following piping systems require vapor barrier protection:
    a. Domestic cold water.
    b. Industrial cold water.
    c. Other piping systems with a nominal operating temperature below 65 degrees F.
3. Vapor Barrier Insulation:
    a. Insulation for pipe requiring vapor barrier protection 1-1/4-inch or smaller, insulation continuous through pipe hangers and rollers.

3.04 **FIELD QUALITY CONTROL**

A. Field Test: Test and approve systems prior to installation of insulation.

B. Existing Insulation:

1. Repair existing insulation damaged during construction.
2. Make neat connections where new and existing insulation meet.

3. Where existing piping, or equipment is removed, cover existing surfaces neatly to match existing.

END OF SECTION

SECTION 22 1500

GENERAL SERVICE COMPRESSED AIR SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. Oil Free Scroll Compressor
2. Receiver
3. Refrigerated Air Dryer
4. Filters

1.02 RELATED SECTIONS

A. Division 01, General Requirements
B. Division 22, Plumbing

1.03 SUBMITTALS

A. Submit the following:

1. Shop Drawings of equipment when standard manufacturers' product data does not describe the product in sufficient detail to allow the contractor to rough-in equipment.
2. Performance Data: Include air flows, pressure drops, capacities, electrical data, control schematics.
3. Product Data: Include manufacturer's current recommended methods of installation.
4. Operating and Maintenance Data

1.04 QUALITY ASSURANCE

A. Select scroll compressors so that motor nameplate rating plus safety factor exceeds required brake horsepower at design conditions.
B. Provide compressed air receivers, pressure relief valves, and other devices in compliance with applicable ASME codes, and stamped with appropriate code symbol as required by the State of Oregon. Provide ASME stamp on equipment where specified.
C. Provide electrical components which have been listed and labeled by Underwriters Laboratories, Canadian Standards Association or other testing agency as approved.

1.05 GUARANTEE

A. Provide per the General and Supplementary Conditions of the Contract.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Oil Free Scroll Air Compressor:

1. Powerex
2. Quincy Northwest
3. Ingersoll Rand

B. Refrigerated Air Dryer:

1. Powerex
2. Wilkerson Model A11-HH-P00.
3. Other Manufacturers: Submit substitution request.

2.02 OIL-FREE SCROLL AIR COMPRESSOR SYSTEM

A. Simplex, tank-mounted compressor with integral receiver, drier, filters, valves,specialties.

2.03 **COMPRESSOR**

A. Class zero rated, oil-free scroll air compressor with magnetic starter panel.
B. Air-cooled.
C. Orientation: Horizontal
D. Drive: Belt
E. Stages: Single
F. Inlet and Exhaust Valves: Not required.
G. Rating: For 100% continuous duty, 30,000 hour run life.
H. Tip Seals: Composite PTFE material, rated for 10,000 hours operation.
I. Bearings: External to air compression chamber. Maintenance not required until 10,000 run hours have passed.
J. Fan: Integral radial flow for cooling.
K. Accessories:

1. Isolation valve
2. Check valve
3. Safety valve
4. ODP electric motor, belts and guard
5. After-cooler

2.04 **RECEIVER TANK**

A. Capacity: 60 gallons
B. Orientation: Horizontal
C. Rating: ASME rated for 200 PSI MAWP.
D. Accessories: pressure gauge, safety relief valve, discharge shut off valve
E. Automatic electronic timer drain, 115 volt.

2.05 **STARTER/CONTROL PANEL**

A. Listing: UL508A
B. Enclosure: NEMA 1
C. Overload protection: 3-leg, with hour meter

2.06 **REFRIGERATED AIR DRIER**

A. General:

1. Non-cycling, direct expansion type
2. Refrigerant: R-134A.
3. Sized to provide 38 degree F pressure dewpoint.
4. Self-regulating for large load swings
5. Integral moisture separator

B. Accessories:

1. Air inlet and outlet high temperature warning lights
2. Air outlet temperature gauge
3. Air outlet pressure gauge.
4. After filter: 0.01 micron coalescing, installed downstream of dryer, with maintenance indicator
5. Pressure reducing valve: Installed downstream of afterfilter.

PART 3 EXECUTION

3.01 PIPING

A. General:

1. Where different pipe materials interconnect, provide appropriate manufactured adapters or flanged connections with using expanded PTFE, non-ink embossed Gore-Tex cut sheet gaskets; 1/8 inch thick. Teflon gasket. Torque to manufacturer’s specifications.
2. Locate hand operated vertical valves which require daily or more frequent operation, at a height not more than 7-feet above floor.
3. Stubs: Install valves where indicated on the drawings and elsewhere to facilitate pipe cleaning, venting, drainage, flushing or testing.
4. Label piping in accordance with Section 22 05 53, Identification for Plumbing Piping and Equipment.

B. Copper:

1. Cut copper piping with wheel cutter.
2. Debur cut ends and blow out chips with nitrogen, or CDA.

3.02 OIL FREE SCROLL AIR COMPRESSOR

A. Install per manufacturer's recommendations.

3.03 DRYER, FILTERS

A. Install per manufacturer's recommendations.
B. Provide the services of a factory trained mechanic to inspect, ready, and start and test equipment to assure that it is in proper working order. Instruct the Owner on the machine operation.

END OF SECTION

SECTION 22 2113

PIPE AND PIPE FITTINGS PLUMBING

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. Black Steel Pipe, Schedule 40
2. Copper Pipe
3. Unions
4. Solder

1.02 RELATED SECTIONS

A. Division 01, General Requirements
B. Division 22, Plumbing
C. Section 22 05 29, Hangers, Supports, and Anchors for Plumbing
D. Section 22 25 00, Plumbing Water Treatment
E. Section 22 05 23, General Duty Valves for Plumbing

1.03 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Piping material and installation to meet requirements of the local plumbing, fire, and building codes and serving utility requirements.
2. Provide chlorination of domestic cold and hot water piping in accordance with County and State health requirements.

B. Pipe Cleaning: If pipe gets plugged or should foaming of water systems occur, disconnect piping, reclean, and reconnect without additional expense to the Owner.
C. Correct damages to the building or systems resulting from failure to properly clean the system without additional expense to the Owner.
D. Products with a wetted surface installed in potable water systems UL classified in accordance with ANSI / NSF-61 for Drinking Water System components, ANSI/NSF-14 for Plastic Piping System Components and certified to the low lead requirements of NSF-372.

1.04 SUBMITTALS

A. Submit the following:

1. List of piping materials indicating the service it is being used for. (Do not submit piping product data).
2. Product data on mechanical couplings and related components, double wall fuel oil pipe and fittings, and polypropylene waste and vent pipe.

B. Test Reports and Certificates: Submit certificates of inspections and pipe tests to Owner.
C. Other: Make certified welders' certificates available.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. As indicated.

2.02 **BLACK STEEL PIPE, SCHEDULE 40**

A. General:

1. Fittings and joints must be UL listed for use with pipe chosen for use.
2. Listing restrictions and installation procedures per state and local authorities must be followed.

B. Pipe: Schedule 40 conforming to ASTM A 135 or A 53.

C. Fittings:

1. 150 pound screwed malleable iron on 2 inches and below, Schedule 40 welding fittings conforming to ASTM A 234 for 2-1/2 inches and above or mechanical couplings on select piping as herein specified.
2. Welded below grade fittings.
3. Long radius type elbows on pumped systems.
4. Short radius elbows not acceptable for use except as approved on a case by case basis.

D. Service:

1. Natural gas piping.

2.03 **COPPER PIPE**

A. Pipe: Hard drawn copper tubing, Class L or K, ASTM B 88.

B. Fittings:

1. Wrought copper, 150 psi; ANSI B16.22 for soldered joints, ANSI B16.50 for brazed joints; Chase, Revere, Mueller or approved equal.
2. System using mechanically extracted collars in main with branch line inserted to not obstruct flow may be used on domestic water piping above ground, similar to T-drill.

C. Service:

1. Domestic cold water piping above ground (Type L, hard drawn).
2. Industrial cold water above grade (Type L).
3. Compressed air
4. Miscellaneous drains and overflows.

2.04 **SOLDER**

A. Soldered Joints:

1. Wrought Copper Pipe Fittings: All-State 430 with Duzall Flux, Engelhard Silvabrite with Engelhard General Purpose Flux or J.W. Harris Co.
2. Valves, Cast Fittings or Bronze Fittings: Harris Stay-Silv-15 or Handy & Harmon Sil-Fos.
3. Applied locations: Above grade piping 2-inch and smaller for the following services: Industrial cold water, domestic cold water.

PART 3 EXECUTION

3.01 **PIPING INSTALLATION**

A. Install piping as to vent and drain. Install according to manufacturer’s recommendations.

B. Support piping independently at apparatus so that its weight not carried by the equipment.

C. Run piping clear of tube cleaning or removal/replacement access area on heat exchangers, water heaters, etc.

3.02 **PIPING JOINTS**

A. Pipe and fittings joined using methods and materials recommended by manufacturer in conformance with standard practice and applicable codes. Cleaning, cutting, reaming,

grooving, etc. done with proper tools and equipment. Hacksaw pipe cutting prohibited. Peening of welds to stop leaks not permitted.

B. Copper Piping:

1. Pipe cut evenly with cutter, ream to full inside diameter; end of pipe and inside of fitting thoroughly cleaned and polished.
2. Joints uniformly heated, and capillary space completely filled with solder material, leaving full bead around entire circumference.

C. Steel Piping:

1. Screwed Joints:

a. Pipes cut evenly with pipe cutter reamed to full inside diameter with burrs and cuttings removed.
b. Joints made up with Teflon liquid dope or Teflon tape applied to male threads only, leaving two threads bare.
c. Joints tightened so that not more than two threads are left showing.

3.03 **ADJUSTING AND CLEANING**

A. General:

1. Clean interior of piping before installation.
2. Flush sediment out of piping systems after installation before connecting plumbing fixtures to the piping.
3. When placing the water systems in service during construction, each system cleaned in accordance with Section 22 25 00, Plumbing Water Treatment prior to being placed in service.
4. Clean strainers prior to placing in service.

3.04 **INSTALLATION, NATURAL GAS PIPING**

A. Install piping where shown on Drawings.

END OF SECTION

SECTION 22 2500

PLUMBING WATER TREATMENT

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. Plumbing Water Treatment

1.02 RELATED SECTIONS

A. Division 01, General Requirements
B. Division 22, Plumbing

1.03 SUBMITTALS

A. Submit the following:

1. Treatment Reports

PART 2 PRODUCTS

2.01 MANUFACTURER

A. US Water Services
B. Nalco
C. Mogul
D. Chemax
E. Chemcoa
F. DuBois Chemicals
G. Water Solutions Northwest
H. Or approved equal.

2.02 PLUMBING WATER TREATMENT

A. Domestic Water Chlorination:

1. Chlorination accomplished by personnel in employed of firm licensed to do this type of work.
2. Potable water systems disinfected prior to use as outlined within the current state or local Plumbing Code or as prescribed by the Health Authority, whichever requirements are more stringent.
3. Chemicals: Sodium Hypochlorite 12.5 percent EPA registered for drinking water application.

PART 3 EXECUTION

3.01 INSTALLATION

A. Plumbing Domestic Water Systems:

1. Provide 1/2-inch injection point on incoming water line immediately after the backflow device.
2. Flush system with fresh water to remove dirt and construction debris.
3. Open all fixtures to develop slow rate of flow through system.
4. Injection Sodium Hypochlorite solution at a rate to achieve greater at 100ppm chlorine at fixtures.
5. Flush entire system so no chlorine is present.

6. Submit bacteriological samples to certified laboratory to certify that the water is suitable for drinking. Deliver certificate stating purity of water to the Architect.

3.02 **FINAL ADJUSTMENT**

A. When the systems are accepted by the Owner the chemical treatment supplier makes final adjustments in the required concentrations.
B. Submit report of indicating initials and final concentrations and system chemistry.

END OF SECTION

SECTION 22 3000

PLUMBING EQUIPMENT

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. Backflow Preventers

1.02 RELATED SECTIONS

A. Division 01, General Requirements
B. Division 22, Plumbing

1.03 QUALITY ASSURANCE

A. Regulatory Requirements: Water heaters to meet state energy code requirements.

1.04 SUBMITTALS

A. Submit the following:

1. Product data for each item specified.
2. Operating and Maintenance Data

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Backflow Preventers:

1. Watts
2. Febco
3. Wilkins
4. Hersey
5. Apollo
6. Ames
7. Other Manufacturers: Submit substitution request.

2.02 BACKFLOW PREVENTERS

A. Reduced Pressure Backflow Assembly (RPBA) Type:

1. 2-inch Size and Smaller:

a. Screwed ends with bubble-tight ball valves, bronze main valve body and cover, bronze main valve with stainless steel 316 trim and four test cocks.
b. Maximum working pressure of 150 psi unless scheduled.

PART 3 EXECUTION

3.01 BACKFLOW PREVENTERS

A. Install at height and location suitable for testing purposes by the local governing authority.
B. Provide funnel drain below reduced pressure backflow device for collecting periodic discharge and testing purposes.
C. Pipe indirect waste from funnel drain as indicated on plans.

END OF SECTION

SECTION 23 0500

COMMON WORK RESULTS FOR HVAC

PART 1 GENERAL

1.01 SUMMARY

A. The intent of Division 23, HVAC Specifications and the accompanying Drawings is to provide a complete and workable facility with complete systems as shown, specified and required by applicable codes. Include work specified in Division 23, HVAC and shown on the accompanying Drawings, including appurtenances, connections, etc., in the finished job.

B. The Drawings that accompany the Division 23, HVAC Specifications are diagrammatic. They do not show every offset, bend, tee, or elbow which may be required to install work in the space provided and avoid conflicts. Offsets and transitions assumed at a minimum at each duct crossing, structural penetrations through shear walls or beams, structural grids where ceiling heights are restricted, and at piping mains. Follow the Drawing as closely as is practical to do so and install additional bends, offsets and elbows where required by local conditions from measurements taken at the Building, subject to approval, and without additional cost to the Owner. The right is reserved to make any reasonable changes in outlet location prior to roughing-in, without cost impact.

C. The General and Supplemental Conditions apply to this Division, including but not limited to:

1. Drawings and specifications.
2. Public ordinances, permits.
3. Include payments and fees required by governing authorities for work of this Division.

D. Division 01, General Requirements, General Requirements, applies to this Division.

1.02 RELATED SECTIONS

A. Division 01, General Requirements

B. Division 23, Heating, Ventilating, and Air Conditioning (HVAC)

1.03 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Products and equipment prohibited from containing pentabrominated, octabrominated, and decabrominated diphenyl ethers. Where products or equipment within this specification contain these banned substances, provide complying products and equipment from approved manufacturers with equal performance characteristics.
2. General: Work and materials conforms to the local and State codes, and Federal, State and other applicable laws and regulations.
3. Contractor responsible for obtaining and payment for permits, licenses, and inspection certificates required in accordance with provisions of Contract Documents.

B. New materials and equipment. Work of good quality, free of faults and defects and in conformance with the Contract Documents.

C. Apparatus built and installed to deliver its full rated capacity at the efficiency for which it was designed.

D. The entire mechanical system and apparatus operates at full capacity without objectionable noise or vibration.

E. Install equipment level and true. Housekeeping pads and curbs account for floor or roof slope.

F. Materials and Equipment:

1. Each piece of equipment furnished meet detailed requirements of the Drawings and Specifications and suitable for the installation shown. Equipment not meeting

requirements will not be acceptable, even though specified by name along with other manufacturers.

2. Where two or more units of the same class of equipment are furnished, use products of the same manufacturer. Component parts of the entire system need not be products of same manufacturer.
3. Furnish materials and equipment of size, make, type, and quality herein specified.
4. Equipment scheduled by performance or model number considered the basis of the design. If other specified manufacturer's equipment is provided in lieu of the basis of design equipment the contractor is responsible for changes and costs which may be necessary to accommodate this equipment, including different sizes and locations for connections, different electrical characteristics, different dimensions, different access requirements, or any other differences which impact the project.

G. Workmanship:

1. General: Install materials in a neat and professional manner.
2. Manufacturer's Instructions:
   a. Follow manufacturer's directions where they cover points not specifically indicated.
   b. If conflict with the Drawings and Division 23, HVAC Specifications, obtain clarification before starting work.

H. Cutting and Patching:

1. Cutting, patching, and repairing for the proper installation and completion of the work specified in this Division including plastering, masonry work, concrete work, carpentry work, and painting performed by skilled craftsmen of each respective trade in conformance with the appropriate Division of Work.
2. Additional openings required in building construction made by drilling or cutting. Use of jackhammer is specifically prohibited.
3. Fill holes which are cut oversize so that a tight fit is obtained around the sleeves passing through.
4. Do no pierce beams or columns without permission of Architect and then only as directed.
5. Restore new or existing work cut or damaged to its original condition.

1.04 **SUBMITTALS**

A. Shop Drawings:

1. The Contract Drawings indicate the general layout of the ductwork and various items of equipment. Coordination with other trades and with field conditions will be required. For this purpose, prepare Shop Drawings of ductwork and equipment installations. Shop Drawings new drawings prepared by Contractor and not reproductions or tracings of Architect's Drawings. Overlay drawings with shop drawings of other trades and check for conflicts. Drawings the same size as Architect's Drawings with title block similar to Contract Drawings and identifying Architect's Drawing number or any reference drawings. Drawings fully dimensioned including both plan and elevation dimensions. Shop drawings cannot be used to make scope changes.
2. Prepare in two-dimensiona] format.
3. Include but are not limited to:
   a. Complete floor plans with sheet metal to a minimum of 1/4-inch equals 1-foot scale.
   b. Submit shop drawings for review prior to beginning fabrication. Additional shop drawings may be requested when it appears that coordination issues are not being

resolved in the field or when there is a question as to whether contract documents are being complied with or the design intent is being met.

B. Product Data:

1. In general, submit product data for review on scheduled pieces of equipment, on equipment requiring electrical connections or connections by other trades, and as required by each specification section or by Drawing notes. Include manufacturer's detailed shop drawings, specifications, and data sheets. Data sheets include capacities, RPM, BHP, pressure drop, design and operating pressures, temperatures, and similar data. Manufacturer's abbreviations or codes are not acceptable.
2. List the name of the motor manufacturer and service factor for each piece of equipment.
3. Indicate equipment operating weights including bases and weight distribution at support points.
4. In the case of equipment such as wiring devices, time switches, valves, etc., specified by specific catalog number, a statement of conformance will suffice.

C. Submission Requirements:

1. Shop Drawings and Product Data:
    a. Refer to Division 01, General Requirements for additional requirements related to submittals.
    b. Submit electronic copies of shop drawings and product data for Work of Division 23, HVAC in PDF format with each item filed under a folder and labeled with its respective specification section number, Article and paragraph and mark if applicable.
    c. Include a complete index in the original submittal. Indicate both original items submitted and note stragglers that will be submitted at a later date to avoid delay in submitting.
    d. Contractor Responsibilities:
2. Submit submittals one time and are in proper order.
3. Ensure that equipment will fit in the space provided.
4. Assure that deviations from Drawings and Specifications are specifically noted in the submittals. Failure to comply will void review automatically.

1.05 AS-BUILT DRAWINGS

A. Record Drawings: Provide hard copies and pdf format.

1. Drawings include the following:
    a. Project Specific Titleblock.
    b. Notations reflecting the as built conditions of any additions to or variations from the construction documents provided as part of the BIM coordination, RFIs, ASIs, Owner Changes, and Field Coordination.

1.06 OPERATING AND MAINTENANCE MANUAL, PARTS LISTS, AND OWNER'S INSTRUCTIONS

A. Refer to Division 01, General Requirements for additional requirements.

B. Submit three bound copies of manufacturer's operation and maintenance instruction manuals and parts lists for each piece of equipment or item requiring servicing. Literature on 8-1/2-inch by 11-inch sheets or catalogs suitable for side binding. Submit data when the work is substantially complete, packaged separately, and clearly identified in durable 3-ring binder. Include name and contact information for location of source parts and service for each piece of equipment. Clearly mark and label in each submittal, the piece of equipment provided with the

proper nameplate and model number identified. Provide wiring diagrams for electrically powered equipment.

C. Instruct Owner thoroughly in proper operation of equipment and systems, in accordance with manufacturer's instruction manuals. Operating instructions cover phases of control.

D. Furnish competent engineer knowledgeable in this building system for minimum of one 8-hour day to instruct Owner in operation and maintenance of systems and equipment. Keep a log of this instruction including dates, times, subjects, and those present and present such log when requested by Architect.

1.07 **PROJECT CONDITIONS**

A. Existing Conditions:

1. Prior to bidding, verify and become familiar with existing conditions by visiting the site, and include factors which may affect the execution of this Work.
2. Include related costs in the initial bid proposal.

B. Coordinate exact requirements governed by actual job conditions. Check information and report discrepancies before fabricating work. Report changes in time to avoid unnecessary work.

C. Coordinate shutdown and start-up of existing, temporary, and new systems and utilities. Notify Owner, the City, and Utility Company.

1.08 **WARRANTY**

A. Provide a written guaranty covering the work of this Division (for a period of one calendar year from the date of acceptance by the Owner) as required by the General Conditions.

B. Provide manufacturer's written warranties for material and equipment furnished under this Division insuring parts and labor for a period of one year from the date of Owner acceptance of Work of this Division.

C. Correct warranty items promptly upon notification.

1.09 **TEST REPORTS AND CERTIFICATES**

A. Submit one copy of test reports and certificates specified herein to the Architect.

1.10 **SUBSTITUTIONS**

A. Submit requests for product substitutions in accordance with the Instructions to Bidders and the General and Supplemental Conditions.

PART 2 PRODUCTS

2.01 **FLOOR, WALL AND CEILING PLATES**

A. Furnish stamped split type plates as follows:

1. Wall Plates: Spun aluminum.

2.02 **ELECTRICAL EQUIPMENT**

A. General: Equipment and installed work as specified under Division 26, Electrical.

B. Coordinate with the electrical Drawings and electrical contractor for minimum electrical equipment bracing requirements based on the available fault current rating at the bus of the panelboard or switchboard serving the piece of equipment. Provide equipment with a Short Circuit Current Rating (SCCR) that meets the bracing requirement.

C. Motors – AC Induction:

1. Furnish as integral part of driven equipment.
2. Drip proof induction type with ball bearings unless noted otherwise.

3. Motors 1 hp and above premium energy efficient type, except for emergency equipment motors.
4. Built to NEMA Standards for the service intended.
5. Rated for voltage specified, suitable for operation within the range of 10 percent above to 10 percent below the specified voltage.
6. Energy Efficient Motors:
    a. Baldor
    b. Westinghouse
    c. General Electric
    d. Or approved equal.
7. Motors meet the efficiency standards identified in the table below as determined using the IEEE Method B test at full load.

MINIMUM MOTOR EFFICIENCIES					
		RPM IEEE 112B Efficiency			
HP	KW	900	1200	1800	3600
1	0.75	--	82.5	85.5	80.0
1.5	1.15	--	86.5	86.5	85.5
2	1.53	--	87.5	86.5	86.5
3	2.3	84.0	89.5	89.5	88.5
5	3.8	85.5	89.5	89.5	89.5
7.5	5.6	87.5	91.7	91.7	91.0
10	7.5	88.5	91.7	91.7	91.7
15	7.5	88.5	91.7	92.4	91.7
20	15.9	90.2	92.4	93.0	92.4
25	18.8	91.0	93.0	93.6	93.0
30	22.5	91.0	93.6	94.1	93.0
40	30.0	91.7	94.1	94.5	93.6
50	37.5	92.4	94.1	94.5	94.1

8. Refer to Equipment Schedules on the Drawings for motor horsepower, voltage, and phase.
9. Refer to individual product sections for additional motor requirements.
10. Furnish motors on belt drive equipment of nominal nameplate horsepower not less than 120 percent of equipment brake horsepower required for performance specified.
11. Built-in thermal overload protection, or be protected externally with separate thermal overload devices with low voltage release or lockout. Hermetically sealed motors have quick trip devices.
12. Motors controlled by variable frequency drives inverter duty rated and have Class F insulation or better. Withstand repeated voltage peaks of 1600V with rise times of 0.1 microseconds and greater in accordance with NEMA Standard MG1 Part 31.
13. Motors served from variable frequency drives equipped with shaft grounding system which provide a path for current to flow between the shaft and motor frame. SGS or equal.
14. Starters: Provided under Division 26, Electrical, suitable for performing the control functions required, with the exception of self-contained equipment and where the starters are furnished as part of the control package.

D. Equipment Wiring:
1. Interconnecting wiring within or on a piece of mechanical equipment provided with the equipment unless shown otherwise.
2. This does not include the wiring of motors, starters and controllers provided under Division 26, Electrical.

E. Control Wiring: Control wiring for mechanical equipment provided under Section 23 09 00, Instrumentation and Controls for HVAC.
F. Codes: Electrical equipment and products bear the UL label as required by governing codes and ordinances.

PART 3 EXECUTION

3.01 **CLEANING**

A. General: Clean mechanical equipment, piping and ductwork of stampings and markings (except those required by codes), iron cuttings, and other refuse.
B. Painted Surfaces: Clean scratched or marred painted surfaces of rust or other foreign matter and paint with matching color industrial enamel, except as otherwise noted.
C. Additional requirements are specified under specific Sections of this Division.

3.02 **EQUIPMENT PROTECTION**

A. Keep ductwork and conduit openings closed by means of plugs or caps to prevent the entrance of foreign matter. Protect piping, conduit, ductwork, equipment, and apparatus against dirty water, chemical or mechanical damage both before and after installation. Restore damaged or contaminated fixtures, equipment, or apparatus to original conditions or replace at no cost to the Owner.
B. Protect bright finished shafts, bearing housings, and similar items until in service. No rust will be permitted.
C. Cover or otherwise suitably protect equipment and materials stored on the job site.

3.03 **ACCESSIBILITY**

A. General: Locate cleanout fittings and other indicating equipment or specialties requiring frequent reading, adjustments, inspection, repairs, and removal or replacement conveniently and accessibly with reference to the finished building.

3.04 **WALL PLATES**

A. Install on piping and ductwork passing through finished walls, floors, ceilings, partitions, and plaster furrings. Plates completely cover opening around pipe and duct.
B. Secure wall and ceiling plates to pipe, insulation, or structure.
C. Plates not penetrate insulation vapor barriers.
D. Plates not required in mechanical rooms or unfinished spaces.

3.05 **PAINTING**

A. General:
    1. Coordinate painting of mechanical equipment and items with products and methods in conformance with the appropriate Division of Work, Painting.
    2. Exposed work under this Division receives either a factory painted finish or a field prime coat finish, except:
        a. Exposed copper piping.
        b. Aluminum jacketed outdoor insulated piping.
B. Equipment Rooms and Finished Areas:
    1. Insulation: Not painted.
    2. Hangers, Uninsulated Piping, Miscellaneous Iron Work, Structural Steel Stands, Uninsulated Tanks, and Equipment Bases: Paint one coat of black enamel.
    3. Equipment:
        a. One coat of grey machinery enamel.

b. Do not paint nameplates.

4. Concealed Spaces (above ceilings, not visible):
5. Insulation: Not painted.
6. Do not paint the following:

   a. Hangers
   b. Uninsulated Piping
   c. Miscellaneous Iron Work
   d. Valve Bodies and Bonnets

C. Exterior Steel: Wire brush and apply two coats of rust-inhibiting primer and one coat of grey exterior machinery enamel.

3.06 **ADJUSTING AND CLEANING**

A. Before operating any equipment or systems, make thorough check to determine that systems have been flushed and cleaned as required and equipment has been properly installed, lubricated, and serviced. Check factory instructions to see that installations have been made accordingly and that recommended lubricants have been used.
B. Use particular care in lubricating bearings to avoid damage by over-lubrication and blowing out seals. Check equipment for damage that may have occurred during shipment, after delivery, or during installation. Repair damaged equipment as approved or replace with new equipment.

3.07 **ELECTRICAL EQUIPMENT**

A. Ductwork or piping for mechanical systems not serving electrical space not installed in any switchgear room, transformer vault, telephone room, or electric closet except as indicated.
B. Ductwork or piping for mechanical systems not to pass over switchboards or electrical panelboards. Where conflicts exist, bring to attention of Architect.

3.08 **EQUIPMENT CONNECTIONS**

A. Make final connections to equipment specified in sections other than Division 23, HVAC of the specifications and Owner furnished equipment in accordance with manufacturer's instructions and shop drawings furnished and as indicated.
B. Refer to Division 11, Equipment for requirements.

END OF SECTION

SECTION 23 0548

SEISMIC CONTROLS FOR HVAC EQUIPMENT

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

B. The provisions of Division 23, Heating, Ventilation and Air Conditioning (HVAC) Section 23 05 00, Common Work Results for HVAC, apply to work specified in this Section.

1.02 SUMMARY

A. This Section includes:

1. Seismic Restraints

B. Isolation of mechanical equipment as indicated on the Drawings and specified herein.

C. Seismic restraint of equipment and ductwork.

1.03 RELATED SECTIONS:

A. Division 01, General Requirements

B. Division 23, Heating, Ventilating, and Air Conditioning (HVAC)

C. Section 23 31 01, HVAC Ducts and Casing-Low Pressure

D. Section 23 31 02, HVAC Ducts and Casing-Medium Pressure

1.04 QUALITY ASSURANCE

A. System of seismic controls designed, detailed, and bear the seal of a professional engineer registered in the State having jurisdiction.

B. Seismic Restraints:

1. Restraint of equipment and ductwork to be in accordance with the current state and local Building Code.
2. Calculations in accordance with current state and local Building Code.

1.05 SUBMITTALS

A. Submit the following:

1. Submit Shop Drawings showing complete details of construction for steel and concrete bases including:

   a. Equipment mounting holes.
   b. Dimensions

2. Structural Details and Calculations substantiating that building structure, anchorages, and fabricated steel braces can safely withstand maximum calculated loads stamped and signed by a registered structural engineer.
3. Installation report as specified in PART 3 of this Section.
4. Operation and maintenance data.

1.06 CONTRACTOR RESPONSIBILITY

A. Adequately restrain all equipment and ductwork to resist seismic forces. Design and select restraint devices to meet seismic requirements as defined in the latest issue of the International Building Code under Earthquake Loads and applicable state and local codes.

B. Have the following responsibilities:

1. Provide Engineering drawings, details, supervision, and instruction to assure proper installation and performance.

PART 2 PRODUCTS

2.01 **SEISMIC RESTRAINTS**

A. General Requirements:

1. Provided for equipment and ductwork, both supported and suspended.
2. Bracing of ductwork shall be in accordance with the state and local code requirements, ASCE 7 Seismic Design Requirements for Nonstructural Components, and with the provisions set forth in the SMACNA seismic restraint manual.
3. The structural requirements for the restraints, including their attachment to the building structure, shall be reviewed and approved by the Structural Engineer.
4. Attachments to supported or suspended equipment must be coordinated with the equipment manufacturer.

B. Supported Equipment:

1. All-directional Seismic Snubbers: Interlocking steel members restrained by a one-piece molded neoprene bushing of bridge bearing neoprene.
2. Replaceable bushing and minimum of 1/4-inch thick. Rated loadings not to exceed 1000 psi.
3. An air gap of 1/4-inch shall be incorporated in the snubber design in all directions before contact is made between the rigid and resilient surfaces.
4. Snubber End Caps:
   a. Removable to allow inspection of internal clearances.
   b. Rotated neoprene bushings be rotated to ensure no short circuits exist before systems are activated.
5. Snubber: Mason Industries, Inc. Type Z-1225

C. Bracing of Ductwork:

1. Brace rectangular ducts with cross sectional areas of 6 square feet and larger. Brace flat oval ducts in the same manner as rectangular ducts. Brace round ducts with diameters of 28-inches and larger. Brace flat oval ducts the same as rectangular ducts of the same nominal size.
2. Exception: No bracing is required if the duct is suspended by hangers 12-inches or less in length, as measured from the top of the duct to the bottom of the support where the hanger is attached.
3. Transverse bracing shall occur at the interval specified in the SMACNA tables or at both ends if the duct run is less than the specified interval. Transverse bracing shall be installed at each duct turn and at each end of a duct run, with a minimum of one brace at each end.
4. Longitudinal bracing shall occur at the interval specified in the SMACNA tables with at least one brace per duct run. Transverse bracing for one duct section may also act as longitudinal bracing for a duct section connected perpendicular to it if the bracing is installed within four feet of the intersection of the ducts and if the bracing is sized for the larger duct. Duct joints shall conform to SMACNA duct construction standards.
5. Install duct flex connections at equipment connections to accept expected differential displacement and protect the equipment connection from damage.

D. Suspended Equipment and Ductwork:

1. Seismic cable restraints shall consist of galvanized steel aircraft cables sized to resist seismic loads with a minimum safety factor of two and arranged to provide all-directional restraint.
2. Cable must be pre-stretched to achieve a certified minimum modulus of elasticity. Cable end connections shall be steel assemblies that swivel to final installation angle and utilize two clamping bolts to provide proper cable engagement.
3. Cable assemblies shall be type SCB at the ceiling and at the clevis bolt, SCBH between the hanger rod and the clevis or SCBV if clamped to a beam, all as manufactured by Mason Industries, Inc.
4. Steel angles or strut, sized to prevent buckling, shall be clamped to pipe or equipment rods utilizing a minimum of three ductile iron clamps at each restraint location when required. Welding of a minimum of three ductile iron clamps at each restraint location when required. Welding of support rods is not acceptable. Rod clamp assemblies shall be type SRC or UCC as manufactured by Mason Industries, Inc.
5. Pipe clevis cross-bolt braces are required in all restraint locations. They shall be special purpose preformed channels deep enough to be held in place by bolts passing over the cross bolt. Clevis cross brace shall be type CCB as manufactured by Mason Industries, Inc.

PART 3 EXECUTION

3.01 GENERAL

A. Do not install any equipment which makes rigid contact with the building.
B. Correct, at no additional cost, all installations which are defective in workmanship or materials.

3.02 PREPARATION

A. Coat steel frames exposed to weather with a rustproof metal primer.
B. Provide hot dipped galvanizing on steel frames as indicated on the plans for corrosion protection in severe conditions.

3.03 INSTALLATION

A. General:

3.04 SEISMIC RESTRAINTS

A. General:

1. Install and adjust seismic restraints so that the equipment and ductwork support is not degraded by the restraints.

B. Bracing of Ductwork:

1. Transverse restraints shall occur at 30-foot intervals or at both ends of the duct run if less than the specified interval. Transverse restraints shall be installed at each duct turn and at each end of a duct run.
2. Longitudinal restraints shall occur at 60-foot intervals with at least one restraint per duct run. Transverse restraints for one duct section may also act as a longitudinal restraint for a duct section connected perpendicular to it if the restraints are installed within 4-feet of the intersection of the ducts and if the restraints are sized for the larger duct. Duct joints shall conform to SMACNA duct construction standards.
3. Hanger straps must be positively attached to the duct within 2-inches of the top of the duct with a minimum of two number 10 sheet metal screws.

4. A group of ducts may be combined in a larger frame so that the combined weights and dimensions of the ducts are less than or equal to the maximum weight and dimensions of the duct for which bracing details are selected.
5. Walls, including gypsum board nonbearing partitions, which have ducts running through them, may replace a typical transverse brace. Provide solid blocking around duct penetrations at stud wall construction.
6. Unbraced ducts shall be installed with a 6-inch minimum clearance to vertical ceiling hanger wires.

C. Suspended Equipment and Ductwork Cable Method:

1. The cables shall be adjusted to a degree of slackness approved by the Structural Engineer.
2. The uplift and downward restraint nuts and Mason type RW neoprene covered steel rebound washers for the Type 6 hangers adjusted so there is a maximum 1/4-inch clearance.
3. C-clamps for attachment to the bottom of I-beams must incorporate a restraining strap.

3.05 **FIELD QUALITY CONTROL**

A. Installation Report: Isolation manufacturer's representative shall confirm that all isolation is installed correctly and submit report stating that isolators are installed as shown on Shop Drawings, isolators are free to work properly, and that installed deflections are as scheduled and as specified.

END OF SECTION

SECTION 23 0553

IDENTIFICATION FOR HVAC EQUIPMENT

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. Equipment Identification

1.02 RELATED SECTIONS

A. Division 01, General Requirements
B. Division 23, Heating, Ventilating, and Air Conditioning (HVAC)

PART 2 PRODUCTS

2.01 EQUIPMENT IDENTIFICATION

A. Nameplates:

1. Tag air handling supply units, fans, and miscellaneous mechanical equipment items with engraved nameplates.
2. 1/16-inch thick, 3-inch by 5-inch laminated 3-ply plastic, center ply white, outer ply black. Form letters by exposing center ply.
3. Identify unit with equipment tag as shown on Drawings and area served.
4. Label constructed from same material as equipment nameplates.

PART 3 EXECUTION

3.01 EQUIPMENT IDENTIFICATION

A. Nameplates: Attach to prominent area of equipment, either with sheet metal screws, brass chain, or contact cement as applicable.

END OF SECTION

SECTION 23 0590

PRESSURE TESTING FOR HVAC SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. Pressure Testing of Ductwork Systems

1.02 RELATED SECTIONS

A. Division 01, General Requirements
B. Division 23, Heating, Ventilating, and Air Conditioning (HVAC)

1.03 QUALITY ASSURANCE

A. Code Compliance: Perform required tests in the presence of the authority having jurisdiction.
B. Owner Witness: Perform tests in the presence of the Owner's representative.
C. Engineer Witness: The Engineer or Engineer's representative reserves the right to observe tests or selected tests to assure compliance with the specifications.
D. Simultaneous Testing: Test observations by the authority having jurisdiction, the Owner's representative, and the Engineer's representative need not occur simultaneously.

1.04 SUBMITTALS

A. Submit the following:

1. Test Reports:

a. Submit certificate of completion, inspection and test by authority having jurisdiction on required piping systems.
b. Submit certificate of test approval by Owner's representative on all systems.
c. For ductwork testing, submit the Test Report.
d. Test report shall contain description of the testing procedure and results, including recommendation for any remedial actions needed.
e. The Engineer's representative will record witnessed tests.

PART 2 PRODUCTS – NOT APPLICABLE

PART 3 EXECUTION

3.01 GENERAL

A. Piping:

1. Test prior to concealment, insulation being applied, and connection to equipment, fixtures, or specialties.
2. Conduct tests with all valves but those used to isolate the test section 10 percent closed.

B. Ductwork: Test prior to connection to equipment and before applying insulation.
C. Leaks: Repair all leaks and retest until stipulated results are achieved.
D. Notification:

1. Advise the Construction Manager 72 hours in advance of each test.
2. Failure to so notify will require test to be rescheduled.

E. Testing Equipment: Provide all necessary pumps, gauges, connections, and similar items required to perform the tests.

3.02 **TESTING REQUIREMENTS**

A. High Pressure Ductwork:

1. Test all ductwork systems at -4-inch static pressure, using a Pacific Air Products Port-O-Lab or Rolok, or a McGill Airflow LEAK DETECTIVE testing machine or approved equivalent.
2. All ductwork testing shall be conducted in accordance with latest published version of the SMACNA HVAC Air Duct Leakage Test Manual.
3. Prior to testing verify that all ductwork has been sealed to meet the SMACNA Seal Class A. for all joints, seams and at al duct wall penetrations.
4. Maximum allowable leakage is defined as Cubic Feet per Minute (CFM) air leakage per 100 square feet SURFACE AREA of duct section tested.

END OF SECTION

SECTION 23 0593

TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. Testing and Balancing of Air Systems

1.02 RELATED SECTIONS

A. Division 01, General Requirements
B. Division 23, Heating, Ventilating, and Air Conditioning (HVAC)

1.03 QUALITY ASSURANCE

A. Acceptable Testing and Balancing Firms:

1. A.I.R., Inc.
2. Air Balance Specialty, Inc.
3. Neudorfer Engineers, Inc.
4. Northwest Engineering Services
5. Pacific Coast Air Balance
6. Accurate Balancing Agency, Inc.
7. Precision Test and Balance, Inc.

B. Other Firms: Submit substitution requests prior to bid date.
C. Industrial Standards: Testing and Balancing shall conform to NEBB, American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE), and American National Standards Institute (ANSI) as follows:

1. NEBB: Comply with Procedural Standards for Testing, Adjusting Balancing of Environmental Systems.
2. ASHRAE: Comply with recommendations pertaining to measurements, instruments, and testing, adjusting and balancing.
3. ANSI:

a. S1.4 Specifications for sound level meters.
b. S1.11 Specifications for Octave-Band and Fractional-Octave-Band analog and digital filters.

4. Instrument Certification: Instruments used shall be accurately calibrated and certified within six months of balancing and maintained in good working order.

D. Test Observation: If requested, the tests shall be conducted in the presence of the Architect or the Architect's representative.

1.04 SUBMITTALS

A. Submit the following:

1. Balancing Log:

a. Include all air outlets, actual field measured air volume, and percentage of design volumes.
b. Provide drawings identifying location of all outlets.

2. Equipment Data Sheets: Indicate actual equipment performance, model numbers, bearing and belt data, motor nameplate data, and final balanced motor data.

3. Additional Data: Submit additional data as provided by Associated Air Balance Council (AABC) Standard forms.
4. Number of Copies: Submit six copies of the above completed information to the Engineer for review and insertion into the Operating and Maintenance Data.
5. Instrument Certification: When requested, submit certificate of calibration for equipment to be used.

B. Record data on NEBB forms or forms approved by the Architect.

1.05 **PROJECT CONDITIONS**

A. Do not perform final testing, adjusting, and balancing work until heating, ventilating, and air conditioning equipment has been completely installed and operating continuously as required.
B. Conduct air testing and balancing with clean filters in place.

1.06 **WARRANTIES**

A. In addition to the Requirements of the Contract, include an extended warranty of six months after completion of test and balance work during which time the Architect at his discretion may request a recheck or resetting of any equipment or device listed in the test reports.

PART 2 PRODUCTS – NOT APPLICABLE

PART 3 EXECUTION

3.01 **GENERAL REQUIREMENTS**

A. Balance to maximum measured flow. Deviation from specified values of ±10 percent at terminal device and ±5 percent at equipment, or mean sound level deviation of 15 decibels. Advise Engineer if deficiencies are generally noted to enable proper corrective actions.

3.02 **AIR SYSTEMS**

A. General: Make measurements in accord with Industrial Standards specified above. Record on appropriate forms.
B. Preliminary:
    1. Identify and list size, type, and manufacture of all equipment to be tested including air outlets and inlets.
    2. Use manufacturer's ratings for equipment to make required calculations except where field test shows ratings to be impractical.
C. Central System:
    1. Set speed to provide air volume at farthest run without excess static pressure.
    2. Read and adjust air supply, return, and exhaust fan units to deliver design conditions at minimum OSA and at 100 percent OSA.
    3. Read static air pressure conditions on all air handling equipment including filter and coil pressure drops and total pressure across the fan. A Dwyer Series 400 air velocity meter only shall be used for final static pressures at equipment and where critical readings are required.
    4. Measure temperature conditions across all outside air, return air, and exhaust dampers to check leakage.
    5. Read and record motor data and amperage draw.
    6. Distribution:
    7. Perform multipoint pitot traverses to confirm instrumentation, shaft tightness, fan operation, etc. Pitot traverses shall be performed using a Dwyer Series 400 air velocity meter only with applicable duct probe.

3.03 **COORDINATION**

A. Coordinate work with other trades to ensure rapid completion of the project.
B. Deficiencies noted during the course of air balancing in the mechanical installation shall be promptly reported to the Architect to allow corrective action to proceed.
C. Periodic review of progress shall be provided as requested.

END OF SECTION

SECTION 23 0700

INSULATION FOR HVAC

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. Duct Insulation, Internal
2. Duct Enclosure, Fire Rated
3. Accessories Ductwork

1.02 RELATED SECTIONS

A. Division 01, General Requirements
B. Division 23, Heating, Ventilating, and Air Conditioning (HVAC)
C. Section 23 05 29, Hangers, Supports and Anchors for HVAC
D. Section 23 31 01, HVAC Ducts and Casing – Low Pressure

1.03 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Prohibit insulating products from containing pentabrominated, octabrominated, and decabrominated diphenyl ethers. Where products within this specification contain these banned substances, provide complying products from approved manufacturers with equal performance characteristics.
2. Flame and Smoke Ratings: Installed composite flame spread not to exceed 25 and smoke developed not to exceed 50 as tested by UL 723 or ASTM E84.
3. Energy Codes: Local Building and Energy Codes govern where insulation performance requirements for thickness exceeds thickness specified.

B. Protection:

1. Protect against dirt, water, chemical, or mechanical damage before, during, and after installation.
2. Repair or replace damaged insulation at no additional cost.

C. Source Quality Control:

1. Service: Use insulation specifically manufactured for service specified.
2. Labeling: Insulation labeled or stamped with brand name and number.
3. Insulation and accessories not to provide nutritional or bodily use to fungi, bacteria, insects, rats, mice, or other vermin, not to react corrosively with equipment, piping, or ductwork, and asbestos free.

1.04 SUBMITTALS

A. Submit the following.

1. Product Data: For each type including density, conductivity, thickness, jacket, vapor barrier, and flame spread and smoke developed indices.

PART 2 PRODUCTS

2.01 MANUFACTURERS

1. Duct Insulation, Internal:
2. Rectangular Ductwork:

a. CertainTeed

b. Johns Manville
c. Knauf
d. Owens Corning

3. Duct Enclosure, Fire Rated:

a. 3M
b. Johns Manville
c. Firemaster
d. Fyrewrap

2.02 **DUCT INSULATION, INTERNAL**

A. Fiberglass Duct Liner.

1. Thermal Conductance: k-0.23 in accordance with ASTM C518 and ASTM C177 at 75 degrees F mean temperature.
2. Maximum Operating Temperature: 250 degrees F as determined by ASTM C 411.
3. Maximum Air Velocity: 6,000 fpm as determined by ASTM C 1071.
4. Fungi Resistance:

a. Does not breed or promote as determined by ASTM C1338.
b. No growth as determined by ASTM G21.

5. Bacteria Resistance: No growth as determined by ASTM G22.
6. Flame-spread index of 25 or less as determined by ASTM E 84 or UL 723.
7. Smoke development index of 50 or less as determined by ASTM E 84 or UL 723.
8. Acoustical Absorption Coefficients:

a. NRC value as tested in accordance with ASTM C423, type A mounting:

1) 1-inch thickness: Minimum NRC 0.70
2) 2-inch thickness: Minimum NRC 0.90

2.03 **DUCT ENCLOSURE, FIRE RATED**

A. Johns Manville:

1. 2-hour Rated: Johns Manville, Super Firetemp M, minimum 3-inch thickness, ASTME2336, 2-hour rated assembly.
2. 1-hour Rated: Johns Manville, Super Firetemp L, minimum 2-1/4-inch thickness, ASTM E2336, 1-hour rated assembly.
3. Joint: Johns Manville, Super Calstik adhesive, modified sodium silicate adhesive.

B. Firemaster: Thermal Ceramics Firemaster duct wrap ceramic fiber blanket, minimum 3-inch total thickness, ASTM E2336, 2-hour rated assembly.

C. Fyrewrap: Unifrax Firewrap duct wrap fiberglass blanket, 1-1/2-inch thickness for 1-hour rated assembly, 3-inch thickness for 2-hour rated assembly. ASTM E2336.

2.04 **ACCESSORIES DUCTWORK**

A. Adhesives:

1. General: Maximum Flame Spread/Smoke Developed Rating of 25/50, SCAQMD Rule 1168 compliant.
2. Fiberglass: Benjamin Foster 85-62, Design Polymerics 2501/2502
3. Elastomeric: Armacell 520 BLV
4. Duct Insulation, Internal: Foster 85-62, Design Polymerics 2501/2502

B. Weld Pins: Duro-Dyne with NC-1 nylon stop clips

C. Cements:

1. Insulating: Ryder.
2. Heat Transfer: Chemax Tracit-300

D. Wire Mesh: 1-inch mesh with 20 gauge annealed steel wire.

E. Mastic: Chicago Mastic:

1. Vapor Barrier: 17-475
2. Outdoor Mastic: 16-110 white

PART 3 EXECUTION

3.01 GENERAL

A. Workmanship:

1. Installation: Insulation installed in first class, neat professional manner.
2. Applicators: Employ by firm that specializes in insulation work.

B. Preparation: Surfaces of ductwork clean, free of oil or dirt, and dry before insulation is applied.

3.02 DUCT INSULATION APPLIED LOCATIONS

A. General:

1. Internally lined ductwork need not be externally insulated.
2. In addition to locations described in specification, internally line medium, low, return and exhaust air ductwork where shown on drawings.
3. Apply fire rated duct enclosure to spray booth exhaust duct from fan to roof.
4. Insulation Applied Location – HVAC Ductwork:

System	Location	Duct Type	Insulation Type	Thickness	Notes
Low Pressure Supply*	15-feet downstream of fans	All	Internally Lined	1-1/2-inch unless otherwise indicated	Note 3
	15-feet downstream of fans	All	Internally Lined	1-inch unless otherwise indicated	Note 3

3.03 DUCTWORK INSTALLATION

A. General:

1. Install in accordance with manufacturer’s instruction.
2. Continuous vapor barrier. Coat with vapor barrier mastic and patch with facing or tape. Joints between insulation and access with vapor barrier mastic.
3. Insulation at access panels to be removable or attached to panel with edges of panel and opening reinforced with metal beading.
4. Internal Duct Liner:

a. Air stream coated surface.
b. Weld pins spaced maximum of 15-inch on center in both directions and within 2-inches of corners and joints. Weld pins flush with liner surface.
c. Complete duct surface coated with adhesive and insulation pressed tightly thereto.
d. Provide edges at terminal points with metal beading and heavily coated with adhesive.
e. Heavily coat joints and corners with adhesive.
f. Damaged areas replaced or heavily coated with adhesive.

B. Duct Enclosure - Fire Rated:

1. Installation: Per manufacturer’s instructions.

2. Joints:
    a. Cement attached boards to one another.
    b. Butter mating surfaces with a 1/8-inch layer adhesive.
    c. Secure fiberglass type material with stainless steel banding, Type 304.
3. Support:
    a. Duct enclosure may be hung from a conventional trapeze arrangement.
    b. Provide adequate support at the bottom of vertical runs.
    c. Expansion: Provide adequate clearance at the end of straight runs to allow for expansion of the metal duct inside the enclosure.

3.04 **FIELD QUALITY CONTROL**

A. Field Test: Test and approve systems prior to installation of insulation.

END OF SECTION

SECTION 23 3101

HVAC DUCTS AND CASING-LOW PRESSURE

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. Supports, Anchorage and Restraints
2. Sheet Metal Ductwork

1.02 RELATED SECTIONS

A. Division 01, General Requirements
B. Division 23, Heating, Ventilating, and Air Conditioning (HVAC)
C. Section 23 07 00, Insulation for HVAC
D. Section 23 33 00, Air Duct Accessories

1.03 QUALITY ASSURANCE

A. Installer Qualifications: Work performed by qualified, experienced mechanics, in accordance with the manual of Duct and Sheet Metal Construction of the Sheet Metal and Air Conditioning Contractors National Association and these Specifications.
B. Regulatory Requirements:

1. Entire ductwork system, including materials and installation, installed in accordance with NFPA 90A.
2. Ductwork and components UL 181 listed, Class I air duct, flame rating not to exceed 25 and smoke rating not to exceed 50.

1.04 SUBMITTALS

A. Submit the following:

1. Provide catalog data on each product specified hereunder.
2. Schedule of duct construction standards.
3. Provide shop drawings showing construction details, support, and seismic restraint of ductwork distribution systems.

PART 2 PRODUCTS

2.01 SUPPORTS, ANCHORAGE AND RESTRAINTS

A. General:

1. Provide design for supports, anchorages, and seismic restraints for equipment when not shown on the Drawings.
2. Supports, anchorage and restraints provided are required to resist seismic forces as specified in the latest edition of the International Building Code for the seismic zone in which the project is constructed.
3. Follow provisions in Section 23 05 48, Vibration and Seismic Control for HVAC Equipment for seismic restraints.
4. Seismic restraints are not to introduce stresses in the ductwork caused by thermal expansion or contraction.
5. Connections to structural framing are not to introduce twisting, torsion, or lateral bending in the framing members. Provide supplementary steel as required.

B. Suspended Ductwork: Provide seismic restraints in accordance with the latest edition of the SMACNA, Seismic Restraint Manual - Guidelines for Mechanical Systems for the seismic hazard level corresponding to the seismic zone in which the project is constructed.
C. Engineered Support Systems: Provide designs and details for the following support systems with the seal of a professional engineer registered in the State having jurisdiction:
    1. Supports and seismic restraints for suspended ductwork and equipment.
    2. Support frames for ductwork and equipment which provide support from below.
    3. Equipment and ductwork support frame anchorage to supporting slab or structure.

2.02 **SHEETMETAL DUCTWORK**

A. Fabricate from galvanized steel, unless noted otherwise.
B. Minimum gauge, duct construction, joint reinforcing, fittings, hangers, and supports in accordance with SMACNA HVAC Duct Construction Standards – Metal and Flexible, Latest Edition.
C. Duct Classification: Ducts considered low pressure when design velocities are 2000 fpm or less and maximum static pressure is 2-inches wg positive or negative.
    1. The following ductwork constructed in accordance with minimum reinforcement requirements for static pressure class of 1/2-inch wg positive or negative.
        a. Supply, return or exhaust ductwork serving fans scheduled to operate at less than 1/2-inch wg
        b. Supply, return, or exhaust branch ductwork which serves one or two inlets/outlets.
    2. The following ductwork constructed in accordance with minimum reinforcement requirements for static pressure class of 1-inch wg positive or negative.
        a. Supply, return, or exhaust ductwork serving fans scheduled to operate at less than 1-inch wg On supply fans pressure drops for louvers, coils, clean filters, and sound traps may be deleted from scheduled fan static.
        b. Supply, return, or exhaust ductwork serving multiple duct branches where contractor can demonstrate that pressures will not exceed 1-inch wg positive or negative.
        c. The following ductwork constructed in accordance with minimum reinforcement requirements for static pressure class of 2-inches wg, positive or negative.
        d. Supply, return, or exhaust ductwork serving fans scheduled to operate at pressures greater than 1-inch wg positive or negative.
D. Longitudinal seams on rectangular duct, Pittsburgh or Button punch snap lock. Snap lock seams for round duct may be used only on ducts classified for 1/2-inch wg. Longitudinal seams for round ducts using lap and rivet, spot weld, or fillet weld may be used only on ducts classified for statics 1-inch wg or less.
E. Joining and reinforcing systems manufactured by Ductmate, Roloc, or TDC are acceptable. Ductmate 35 is equivalent to SMACNA J, and Ductmate 25 is equivalent to SMACNA F.
F. Use of adjustable round elbows not permitted.

PART 3 EXECUTION

3.01 **APPLIED LOCATIONS**

A. Supply ductwork: Galvanized sheet metal ductwork, lined where indicated on the Drawings or as specified in Section 23 07 00, Insulation for HVAC.
B. Return ductwork from dust collector fan to room discharge: Galvanized sheet metal ductwork, lined where indicated on the Drawings or as specified in Section 23 07 00, Insulation for HVAC.
C. Exhaust Ductwork: Galvanized sheet metal ductwork.

3.02 **INSTALLATION**

A. Ductwork:

1. Seal traverse joints with an approved mastic during joining procedure or tape after joining to provide airtight duct system.
2. Low pressure ductwork hanger and support systems in accordance with SMACNA HVAC Duct Construction Standards – Metal and Flexible. Wire supports are not allowed.
3. Provide supplementary steel for support of ductwork in shafts and between building structural members.
4. Fabricate changes in direction to permit easy air flow, using full 1.5D radius bends or fixed turning vanes in square elbows. Radius elbows less than 1.5D radius, splitter vanes.
5. Change in duct size or shape necessitated by interference made using rectangular equivalents of equal velocity.
6. Where pipe, structural member, or other obstruction passes through a duct, provide streamlined sheet metal collar around member and increase duct size to maintain net free area. Fit collar and caulk to make air tight.

B. Sound Attenuation (Internal Insulation):

1. Provide sound attenuation duct where shown and as specified under Section 23 07 00, Insulation for HVAC.
2. Duct dimensions shown are net inside attenuating material.

C. Ductwork, Exposed or Visible in Finished Areas:

1. Use extreme care in handling and installing.
2. Replace dented or damaged sections.
3. Install ductwork straight and true, parallel to building lines.
4. Make connections with pop rivets using couplings where applicable. Grind raw edges smooth and apply paintable sealant to cover imperfections.
5. Remove excess sealant to provide a finished joint.
6. Provide floor, wall, and ceiling plates as specified in Section 23 05 00, Common Work Results for HVAC.
7. Finish, clean and prime ductwork, and hangers for painting.

3.03 **FIELD QUALITY CONTROL**

A. Coordination with Balance Agency:

1. Provide services of a sheet metal person familiar with the system ductwork to provide assistance to the balancing agency during the initial phases of air balancing in locating sheet metal dampers.

END OF SECTION

SECTION 23 3103

HVAC INDUSTRIAL DUCTS AND CASING-HIGH PRESSURE

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. Supports, Anchorage, and Restraints
2. Single Wall Round Duct and Fittings

1.02 RELATED SECTIONS

A. Division 01, General Requirements
B. Division 23, Heating, Ventilating, and Air Conditioning (HVAC)
C. Section 23 33 00, Air Duct Accessories

1.03 QUALITY ASSURANCE

A. Installer Qualifications:

1. Work performed by qualified, experienced mechanics, in accordance with the manual of Round Industrial Duct and Sheet Metal Construction of the Sheet Metal and Air Conditioning Contractors National Association and these Specifications.
2. Materials and workmanship subject to inspection at the location where fabrication and/or erection are carried on.
3. Exhaust systems should be constructed with materials suitable for the conditions of service and installed in a permanent and workmanlike manner. Interior of ducts should be smooth and free from obstructions, especially at joints.
4. Deviation from the sealing, installation, and testing requirements of this Specification must be approved.

B. Regulatory Requirements:

1. Entire ductwork system, including materials and installation, installed in accordance with NFPA 90A.
2. Ductwork and components UL 181 listed, Class I air duct, flame rating not to exceed 25 and smoke rating not to exceed 50.

1.00 SUBMITTALS

A. Submit the following:

1. Shop Drawings of ductwork and plenums specified hereunder. Include details of supports and seismic restraint of ductwork distribution systems.
2. Product data on high pressure round ductwork and fittings.

1.01 GUARANTEE

A. Guarantee directly to the Owner, in writing, labor and materials cost to repair or replace faulty ductwork for a period of three years, at no cost to the Owner.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Single Wall Round Duct and Fittings:

1. United Sheet Metal
2. Semco
3. Streimers

4. Dee's
5. Metco
6. Temp Control
7. Robert Lloyd Sheet Metal
8. Other Manufacturers: Submit substitution request.

2.02 **GENERAL**

A. Minimum gauge, duct construction, joint reinforcing, fittings, hangers, and supports in accordance with the latest edition of SMACNA Round Industrial Duct Construction Standards.

B. Duct Classification:

1. Ducts considered high pressure when design velocities exceed 2000 fpm or designed to operate at static pressure of 3-inches wg or greater negative.
2. Ducts constructed in accordance with minimum reinforcement requirements for static pressure class of 6-inches negative

C. Construction:

1. Ductwork:

a. Longitudinal joints or seams should be lapped and riveted or spot welded on 3-inch centers maximum. Double lock seams are limited to Class 1 applications.
b. Girth joints except welded or flanged should be made with an inner lap in the direction of flow of 1-1/2-inch and riveted or spot welded on 4-1/2-inch centers with not less than four rivets for lap joint.
c. Spiral wound duct:

1) For the same duty, materials gauges may be two gauge numbers lighter than specified for fabricated ductwork.
2) Unless flanges are used for joints, the duct should be supported close to each joint, usually within 2-inches. Additional supports may be needed.

2. Fittings:

a. Elbows and bends should be a minimum of two gauges heavier than straight lengths of equal diameter and have a centerline radius of at least 1-1/2 times the pipe diameter.
b. Elbows of 90 degrees should be five-piece construction for round duct up to 6-inches and seven-piece for larger diameters. Bends of less than 90 degrees should have a proportional number of pieces. Prefabricated elbows of smooth construction may be used.
c. Branches enter the main at the large end of the transition at an angle not to exceed 45 degrees. Connections should be to the top or side of the main with no two branches entering at opposite sides except where shown.
d. Transitions in mains and sub-mains should be tapered. The taper should be at least 5 units long for each 1 unit change in diameter unless noted otherwise.
e. Provide cleanouts in horizontal runs of ducts carrying dust-laden air and especially near elbows, junctions, and vertical runs. The spacing of cleanout doors should not exceed 12 for ducts of 12-inches diameter and less but may be greater for larger duct sizes.

2.03 **SUPPORTS, ANCHORAGE AND RESTRAINTS**

A. General:

1. Provide design for supports, anchorages, and seismic restraints for equipment when not shown on the Drawings.

2. Supports, anchorage and restraints provided are required to resist seismic forces as specified in the latest edition of the International Building Code for the seismic zone in which the project is constructed.
3. Seismic restraints are not to introduce stresses in the ductwork caused by thermal expansion or contraction.
4. Connections to structural framing are not to introduce twisting, torsion, or lateral bending in the framing members. Provide supplementary steel as required.

B. Suspended Ductwork: Provide seismic restraints in accordance with the latest edition of the SMACNA, Seismic Restraint Manual - Guidelines for Mechanical Systems for the seismic hazard level corresponding to the seismic zone in which the project is constructed.

C. Engineered Support Systems: Provide designs and details for the following support systems with the seal of a professional engineer registered in the State having jurisdiction:

1. Supports and seismic restraints for suspended ductwork and equipment.
2. Support frames for ductwork and equipment which provide support from below.
3. Equipment and ductwork support frame anchorage to supporting slab or structure.

2.04 SINGLE WALL ROUND DUCT AND FITTINGS

A. Materials:

1. Round ductwork up to 36-inch diameter spiral lock seam. Round ducts over 36 inches in diameter either spiral lock seam or shop fabricated with longitudinal seams.
2. Takeoffs:
   a. Main and branch takeoffs similar to United Spiral Uniform Duct fittings type SRHTC, SRHTL, or SRHL, typically.
   b. No saddle fittings allowed.
   c. Welded fittings.
   d. Saddle fittings with pop rivet fasteners and sealed with high pressure duct sealer may be used only when adding takeoff fittings to existing duct.
3. Transitions, Elbows:
   a. Transitions of concentric type or eccentric type to maintain elevations detailed with not more than 15 degree angle variation on sloped portion.
   b. Y-Branch fittings similar to United Uniseal SRHY or SRHYR. Bull head tees not allowed.

2.05 ALTERNATE CLAMPED DUCT SYSTEM

A. As an alternate to dust collection ductwork described above a system consisting of quick connect, quick assembly, no-weld round ductwork is acceptable, such as the Clamp Together Duct System by US Duct. Clamps shall be stainless steel.

2.06 DUST COLLECTOR FLEXIBLE HOSE

A. Flexible Hose: Flexhaust Model CWC; constructed of flexible double-ply neoprene polyester with spring steel wire reinforcement. Hose connections with end connection suitable for equipment. Length of hose connections as required for connection to equipment. Hose diameter to be same size as the duct it connects into.

PART 3 EXECUTION

3.01 APPLIED LOCATIONS

A. Steel Ductwork: Dust collection exhaust.

3.02 **INSTALLATION, GENERAL REQUIREMENTS**

A. General: Install entire duct system with a minimum number of bends and transitions.
B. Slope:
   1. Slope entire exhaust system to drain or as shown on Drawings.
   2. Install eccentric reducers so that bottom of duct is straight for drainage.
C. Accessibility:
   1. Position ductwork to allow easy access to existing and new components for maintenance, and for adequate space for tube removal or other repairs.
   2. Install ducts so they do not interfere with equipment access or obstruct passages.
D. Longitudinal Seams: Install ductwork with longitudinal seam on top of duct.
E. Support of Ductwork:
   1. Support ductwork from hanger or trapeze supports spaced at not greater than 6-foot centers, with hanger straps wound completely around duct. Provide supplementary steel as required. See Noise, Vibration, and Seismic Control section of Specifications for additional requirements.
   2. Penetration of duct by means for the attachment of support straps is not permitted.
   3. Provide supports at fittings and takeoffs as required to prevent stresses at joints.
   4. Provide duct supports of sufficient capacity to carry the weight of the system if half filled with material or water and to place no load on the connecting equipment. See SMACNA standards (Ref. 138 and 139).
F. Provide adequate clearance between ducts and ceilings, walls, or floors for installation and maintenance.
G. Missing Sizes: Size section of duct for which size is not indicated or intermediate section erroneously shown undersized the same size as largest pipe connecting to it.
H. Ductwork to be liquid tight.

3.03 **FIELD QUALITY CONTROL**

A. Perform tests in accordance with other Sections of this Division of Work.
B. Upon request of the Owner or his representative, remove random samples of installed work sufficient to establish the quality of materials and workmanship. If such samples indicate the materials or workmanship do not meet the contract Specification, the Contractor will be required to correct, replace, or clean the installed work as deemed necessary by the Owner's representative.

3.04 **ADJUSTING AND CLEANING**

A. Balancing and adjustment work done by the approved balancing firm.
B. Make systems ready for balancing and make available the services of one man including tools to assist balancing personnel. Make system modifications as directed by balancing firm.
C. Leave dampers wide open.

END OF SECTION

SECTION 23 3300

AIR DUCT ACCESSORIES

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. High Pressure Duct Accessories
2. Low Pressure Duct Accessories
3. Fire Dampers

1.02 RELATED SECTIONS

A. Division 01, General Requirements
B. Division 23, Heating, Ventilating, and Air Conditioning (HVAC)
C. Section 23 31 01, HVAC Ducts and Casing-Low Pressure
D. Section 23 31 03, HVAC Industrial Ducts and Casing- High Pressure

1.03 QUALITY ASSURANCE

A. Work performed by qualified, experienced mechanics in accordance with the manual of Duct and Sheet Metal Construction of the National Association of Sheet Metal and Air Conditioning Contractors and these Specifications.
B. Install entire ductwork system, including materials and installation, in accordance with NFPA 90A.
C. Flexible connectors, flexible equipment connections, tapes, and sealants listed as UL 181, Class I air duct. Flame spread rating not to exceed 25 and smoke developed rating not to exceed 50.

1.04 SUBMITTALS

A. Submit the following: Product data for Duct Accessories.

1. Low and High Pressure Duct Accessories:

a. Access Doors

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. High Pressure Duct Accessories:

1. Access Doors:

a. United Sheetmetal APR or ASR
b. Metco
c. Semco
d. Cesco
e. Ruskin
f. Nailor-Hart
g. Or approved equal.

2.02 HIGH PRESSURE DUCT ACCESSORIES

A. Access Doors:

1. Round to match duct, single wall to open against positive duct pressure, fastened with spring clips, pressure seal gasket, fastened with chain. Double wall access doors similar except provide insulated frame and insulated door.

B. Blast Gates: Winkler “Half Gate Style HG”. Galvanized steel construction.

2.03 **LOW PRESSURE DUCT ACCESSORIES**

A. Duct Sealer:

1. Based On:

a. McGill Airseal Zero
b. Design Polymerics DP 1090

2. Description:

a. Suitable for indoor/outdoor use, including application in moist conditions, rated to 10-inch wg.
b. Maximum Flame Spread/Smoke Developed Rating of 25/50, maximum VOC of 420 g/L less water.
c. SCAQMD Rule 1168 compliant.

B. Duct Tape for Sheet Metal:

1. ARNO C520 duct tape similar United
2. Duro Dyne Corporation
3. Nashua

C. Tape and Adhesive/Activator System for Sheet Metal: Hardcast, Polymer Adhesives.

D. Turning Vane Assemblies:

1. Sheet Metal Vanes: Multiple radius hollow vane air foil type 2-inch (small vane) or 4-1/2-inch (large vane) inside radius, galvanized steel construction.
2. Runners: Push-on type.

2.04 **FIRE DAMPERS**

A. Static Fire Dampers:

1. Code Compliance: Provide static fire dampers with a UL 555 label for fire rating indicated and in conformance with NFPA 90A.
2. Integrally hinged, folding blade curtain type, for installation in ductwork complete with 160 degrees F fire link and retainer.
3. Suitable for horizontal or vertical installation as required. Furnish stainless steel closure springs and cam lock for complete damper closure on dampers to be installed in vertical air flow positions.
4. Medium pressure, 1-1/2-hour: For use in partitions up to 2-hour rating with damper out of air stream. Ruskin Model IBD2, Style C for rectangular, Style CR for round, style CO for oval.

PART 3 EXECUTION

3.01 **INSTALLATION**

A. Install devices as shown on the Contract Drawings and per manufacturer’s recommendations.

B. Low Pressure Duct Accessory installation specified under Section 23 31 01, HVAC Ducts and Casing-Low Pressure.

C. Fire Dampers:

1. Install dampers in accordance with NFPA 90A and manufacturer’s written recommendations.
2. Size and locate dampers as shown on Drawings.

3. Where dampers are not accessible for servicing by removing an outlet, provide access doors for servicing. Doors compatible with the duct in which they are installed.

D. Access Doors: Install where indicated and at automatic control dampers and fire dampers, to provide access for cleaning and maintenance.

END OF SECTION

SECTION 23 3319

DUCT SILENCERS

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. Duct Silencers

1.02 RELATED SECTIONS

A. Division 01, General Requirements
B. Division 23, Heating, Ventilating, and Air Conditioning (HVAC)
C. Section 23 31 01, HVAC Ducts and Casing-Low Pressure
D. Section 23 34 00, HVAC Air Cleaning Devices

1.03 QUALITY ASSURANCE

A. Silencer performance characteristics, including insertion loss, pressure drop, and generated noise, attained through testing in accordance with the latest ASTM E477 test standard for acoustical duct silencers.
B. Performance Data:

1. Obtain from the manufacturer's NVLAP accredited laboratory.
2. Laboratory performance verification in the manufacturer's test facility may be requested, in which case a comparative test report made available to the engineer.

C. Combustion ratings for acoustic media equal to or less than the combustion ratings noted below when tested in accordance with ASTM E84 or UL723:

1. Flame Spread Classification: < 25
2. Smoke Development Rating: < 50

D. Silencers factory fabricated and supplied by the same manufacturer.
E. Construct silencers in accordance with ASHRAE and SMACNA standards for the pressure and velocity classification specified for the air distribution system in which it is installed.

1.04 SUBMITTALS

A. Submit the following:

1. Manufacturer's performance data for dynamic insertion loss, generated noise, and pressure drop provided and obtained in accordance with ASTM E477.
2. Schedule of data for each silencer with the size, configuration, airflow rate, and airflow direction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Duct Silencers

1. VAW
2. Price
3. Vibro-Acoustics
4. Ruskin
5. Dynasonics
6. Commercial Acoustics
7. Semco

8. Other Manufacturers: Submit substitution request.

2.02 **DUCT SILENCERS**

A. Pressure rated airtight at 6-inch wg differential between inside and outside of silencer.
B. Acoustical Fill Material:
   1. Inorganic Glass Fiber:
      a. Not less than 4 pcf density.
      b. Not less than 10 percent compression.
      c. Inert, vermin resistant, and moisture resistant.

PART 3 EXECUTION

3.01 **INSTALLATION**

A. Install in ducts per manufacturer's recommendations.
B. Seal space between each module with nosing strips and duct sealer to prevent air from passing between modules.
C. Where attenuators are installed directly on concrete, provide 30 roofing felt or 1-inch roofing insulation under attenuators. Not required when attenuators do not come in contact with concrete.

END OF SECTION

SECTION 23 3400

HVAC FANS

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. Roof Exhaust Fans

1.02 RELATED SECTIONS

A. Division 01, General Requirements
B. Division 23, Heating, Ventilating, and Air Conditioning (HVAC)

1.03 SUBMITTALS

A. Submit the following:

1. Shop Drawings: Showing dimensions, details of construction.
2. Product Data: Showing performance of fans.
3. Operation and Maintenance Data

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Roof Exhaust Fans:

1. Penn-Barry
2. Greenheck
3. Cook
4. Twin City
5. Other Manufacturers: Submit substitution request.

2.02 ROOF EXHAUST FANS

A. General Description: Provide curb mounted centrifugal roof exhauster.
B. Fans:

1. Single width, single inlet, airfoil blades as indicated.
2. One piece heavy gauge spun aluminum construction, steel inlet bell, arranged for curb mounting.
3. Statically and dynamically balanced in the factory as an assembly within its own bearings with a maximum full amplitude shaft deflection at bearings not to exceed 0.003-inch at 1200 RPM to meet ANSI S 2.19 G6.3 balance quality grade.
4. Grease packed pillow block sealed bearings with not less than two pillow blocks per fan assembly.

C. Motor:

1. Integrally mounted, 1800 rpm maximum, with pre-lubricated sealed ball bearings.
2. Provide EC motor where scheduled.
3. Refer to Section 23 05 00, Common Work Results for HVAC for energy efficient motor requirements.

D. Drive: Direct drive matched to fan loads.
E. Fan wheel and motor mounted on integral double deflection neoprene isolators.
F. Accessories:

1. Bird screen

2. Disconnect Switch under Enclosure
3. Roof Curb

G. Account for roof slope to provide level mounting service for equipment.
H. Curb height accounts for roof insulation depth and flashing requirements.
I. Provide automatic motorized control damper, aluminum blades with felt edges.
J. Control: Provide wall-mounted, line-voltage cooling-only thermostat to operate fan to maintain temperature setpoint in air compressor room. Automatic damper to open upon start of fan motor.

PART 3 EXECUTION

3.01 **ROOF EXHAUST FANS**

A. Mount fan on roof curb in accordance with the manufacturer's recommendations. Anchor fan to curb and curb to roof. Coordinate roof opening size and curb location.
B. Connect ductwork.

END OF SECTION

SECTION 23 3520

SPRAY BOOTHS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Prefabricated open faced paint spray booth with wall and ceiling panels.
B. Exhaust fan, filters, and lighting.

1.02 RELATED SECTIONS

A. Section 21 2400 – Dry Chemical Fire Extinguishing System
B. Section 22 0500 - Common Motor Requirements

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Shop Drawings: Indicate layout, booth dimensions, materials, components, fasteners, hardware, equipment, finishes, method of installation and assembly, panel placement, supplementary structural support or bracing, controls, and service rough-in.
C. Product Data: Provide data on booth, hardware and fixtures, joint details.
D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.
E. Certificates: Certify that products of this section meet or exceed specified requirements.
F. Operation Data: Include operating equipment, service and lubrication schedules.
G. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

PART 2 PRODUCTS

2.01 PAINT SPRAY BOOTHS

A. Open Face Spray Booths: Factory-fabricated packaged units, comprised of modular panels, equipment, and fittings.
B. Basis of Design: Global Finishing Solutions Fast-Pak Express Booths (FPX Model)
C. Interior Dimensions: 6' wide x 7' height x 6' depth.
D. Fan, electrical characteristics: As scheduled.

2.02 COMPONENTS

A. Single skin 18 gage galvanized steel construction.
B. Non-sparking tube axial exhaust fan with belt guard.
C. Integral light fixtures.
D. Exhaust chamber and filters with manometer.
E. Wall Panels:
    1. Exterior Sheet: 0.030 inch (0.75 mm) minimum thickness, aluminum.
    2. Interior Sheet: 0.030 inch (0.75 mm) minimum thickness, aluminum.
    3. Assembly hardware including bolts, nuts and caulking.
F. Ceiling Panels: Same construction as walls except exterior sheets of 0.023 inch (0.6 mm) minimum thickness, aluminum.

2.03 **EXHAUST CHAMBER**

A. Industrial style with 20” x 20” x 2” filter cells.
B. Filters: Polyester, with one set of wire grids an tips
C. Manometer: Dwyer Mark II meeting NFPA 33.

2.04 **EQUIPMENT**

A. Exhaust System
    1. Fan: Tube-axial in-line exhaust fan
        a. Housing: Continuously welded, airtight.
        b. Propellers: Non-sparking cast aluminum
        c. Bearings: Premium, self-aligning, with L10 life of 40,000 hours.
        d. Belt Guard: OSHA compliant.
        e. Standards: AMCA 210
    2. Motor: TEFC, high efficiency, variable pitched drive sleeve
B. Lighting
    1. Fixture Type: LED, 4-foot, 4-tube
    2. Access: Inside
    3. Lamps: 85% color corrected
    4. Listing: ETL, class I, Division 2
    5. Interlock: Disables painting operation when light access door is opened.

2.05 **CONTROL PANEL**

A. Connection: Pre-wired, single-point to the line side of main disconnecting device.
B. Components:
    1. Non-fused disconnect
    2. Magnetic motor starter
    3. Motor fuse protection
    4. Lighting contactor
    5. Lighting fuse protection
    6. Terminal strips for field wiring
    7. System operating lights
    8. UL or ETL listing
    9. Stop/start button
C. Interlock with makeup air unit. Both must run under normal conditions.

2.06 **SAFETY COMPLIANCE**

A. 3-Way solenoid valve to prevent spraying in booth when fan is off or light tube access door is open.

PART 3 EXECUTION

3.01 **INSTALLATION**

A. Assemble and install components in accordance with manufacturer's instructions.
B. Set wall attachments on floor and anchor securely. Align over insulated break of recessed insulated floor slab.
C. Cut holes, install anchors, and seal room panels for fire protection, power, and lighting.
D. Coordinate with installation of dry chemical fire protection system.

3.02 **CLEANING**

A. Remove temporary protection from prefinished surfaces.

3.03 **CLOSEOUT ACTIVITIES**

A. Demonstrate, in the presence of Owner, the operation, function, and maintenance of each booth and its associated equipment.

END OF SECTION

SECTION 23 3700

AIR OUTLETS AND INLETS

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. Diffusers
2. Grilles

1.02 RELATED SECTIONS

A. Division 01, General Requirements
B. Division 23, Heating, Ventilating, and Air Conditioning (HVAC)
C. Section 23 33 00, Duct Accessories

1.03 SUBMITTALS

A. Submit the following:

1. Shop Drawings: Showing dimensions and details of construction.
2. Product Data

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Where only Titus figure numbers are listed, equivalent products by the following manufacturers by using only one:

1. Price
2. Krueger
3. Tuttle & Bailey
4. Anemostat
5. Nailor
6. Other Manufacturers: Submit substitution request.

2.02 DIFFUSERS AND GRILLES

A. Ceiling Supply Diffuser (C-1):

1. Curved deflectors, individually adjustable to regulate volume and discharge; 4-way discharge; rectangular neck, surface mount; steel construction.
2. White baked enamel finish, Titus Model 250

B. Wall Return/Exhaust Grille (H-1):

1. Aluminum 45 degree fixed single deflection, horizontal blades 3/4-inch spacing 1-1/4-inch border, gasketed around face flange, white baked enamel finish.
2. Titus Model 3F manufacturer.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install diffusers tight to their respective mounting surfaces.
B. Installed plumb and true with room dimensions and accurately centered on projections as shown on the Architectural reflected ceiling plans.
C. Set pattern control for directions of throw as shown on Drawings prior to air balancer arriving on Project.

D. Paint ductwork behind outlets flat black.

END OF SECTION

SECTION 23 4000

HVAC AIR CLEANING DEVICES

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. Medium Efficiency Pleated Filters
2. Dust Collector, Cabinet Type
3. Spark Detection System
4. Abort Gate

1.02 RELATED SECTIONS

A. Division 01, General Requirements
B. Division 23, Heating, Ventilating, and Air Conditioning (HVAC)
C. Section 23 33 19 Duct Silencers

1.03 SUBMITTALS

A. Submit the following:

1. Shop Drawings: Details of construction and dimensional data.
2. Product Data: Air filters, gauges, including performance data.
3. Operation and maintenance data

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Medium Efficiency Pleated Filters:

1. Camfil-Farr 30-30, Cambridge, American Air Filter, Eco-Air Products, Flanders Precisionaire.
2. Other Manufacturers: Submit Substitution Request.

B. Duct collector, Cabinet Type:

1. American Air Filter **PulsePak Prime**
2. Other Manufacturers: Submit substitution request.

~~C. Cambridge~~

~~1. American Air Filter~~
~~2. Other Manufacturers: Submit substitution request.~~

2.02 MEDIUM EFFICIENCY PLEATED FILTERS

A. Description:

1. 2-inch thick medium efficiency, pleated fabric media disposable type filter with support grid and enclosing frame.
2. UL Class 2.
3. Size as indicated on drawings.

B. Rating: 30 percent MERV 8 efficiency rated on ASHRAE Standard 52.1-1992 and 52.2-1999 respectively.

C. Performance: Filters capable of maintaining rated efficiency at 500 fpm face velocity with initial pressure drop not to exceed 0.30-inch wg and final pressure drop at 0.90-inch wg.

D. Frame: Provide complete factory assembled galvanized steel frame assembly suitable for filters, including necessary hardware for supporting and holding filters in place with an air tight seal around frame, side access on air handling units.

2.03 **DUST COLLECTOR, CABINET TYPE**

A. Description: Completely self-contained cabinet type dust collector consisting of the following:

1. Unit Housing
2. Removable Filter Cartridge
3. Explosion Vent
4. Hopper
5. Barrel Top Adapter
6. Automatic Vibrator
7. Air Nozzle Cleaning

B. Pad-mounted adjacent to collector cabinet: Fan and motor.
C. Material Collected: Wood chips and saw dust.
D. Dust Collector Casing:

1. Heavy gauge, galvanized steel casing, ribbed and reinforced, with easy access to filters, and air nozzles.
2. Factory enamel finish.
3. Rated for -20-inch WG operating pressure

E. Configuration: Inlet high on front side, above filters. Downflow across filters. Bottom outlet.
F. Fan:

1. Totally enclosed single-inlet, single-width, backward curved blades, upblast configuration
2. Class 4
3. Drain with plug
4. Bolted and gasketed access door
5. Inlet and outlet flanges
6. Bearings: L-10 life of 100,000 hours at maximum RPM
7. Drive: Direct
8. AMCA C
9. Shaft: AISI-1045 with rust preventive coating

G. Duct Silencers:

1. Fan inlet: Vertically installed, elbow style, connects to collector outlet.
2. Fan outlet: Horizontally installed, in return duct, 7 feet in length.
3. Combined effect is to maintain 65dBa inside shop.
4. Air pressure drop: As scheduled.

H. Motors:

1. Totally Enclosed
2. Permanently Lubricated Bearings
3. Premium efficiency.

I. Fabric Filter Media:

1. Durable
2. Cleanable
3. Self-Locking, accessible through hinged doors.
4. Flame Retardant
5. Polyester Cartridges, MERV 15 rated.

J. Hopper, Barrels, and Barrel Adapters:

1. Hoppers with 60-degree funnel terminating in a 12-inch diameter drum connection device without gates or doors to permit immediate downflow or dust into disposal container.
2. Accommodates two 55 gallon drums.
3. Barrel top adapters: Hard pipe, suitable for collector with explosion venting.
4. Support legs: Designed for seismic zone IV specifications, 130 mph wind and 48-inch clearance under hopper.
5. Cleaning System
6. Automatic, on-line, activated by differential pressure across filters.
7. Pulse controller located in NEMA 4X enclosure.
8. Diaphragm Valves: Solenoid operated with silencers

K. Explosion Vent: With weather cover, located on top of unit.

L. Access Platform: With ladder, bar grating and handrail around platform.

M. Controls:

1. Complete controls including variable frequency drive, time delays, timers, transformer, relays, start/stop switch, contained in a factory prewired NEMA 3R control panel with UL 508 label.
2. Start button to energized blower/motor, stop button to de-energize blower motor., after two minute delay solenoid valves open to operate air cleaning through adjustable timer, interlock motors so motors cannot operate simultaneously.
3. Differential Pressure Controller
4. Remote stop/start push button
5. Electrical control package to be explosion proof.
6. Provide unit with single point power connection.

N. Additional Acoustical Controls:

1. Removable sound insulating jacket for fan.
2. Solenoid Silencers

2.04 SPARK DETECTION SYSTEM

A. Description: Wood dust collection system spark detection and suppression

B. Components

1. Detectors: Two duct spark detectors with 3-conductor cable, and cable stub connections
2. Control Panel
3. Shutdown relay
4. Abort relay
5. Water spray nozzle: 19 gpm, minimum 50 psi, maximum 100 psi, 1-inch pipe connection with solenoid control valve.

2.05 ABORT GATE

A. Description: High speed solenoid operated abort gate controlled by electrical signal generated by spark detection from either detector

B. Construction: 10 gauge mild steel with powder coated safety yellow finish.

C. Power requirement: 120 volt.

D. Control: Wired from spark detection panel.

E. Gate: With manual reset handle per NFPA 664.

PART 3 EXECUTION

3.01 INSTALLATION, PLEATED FILTERS

A. Arrange for access and removal of filter elements.
B. Install filters in air handling unit filter racks, filter grilles and other locations shown on the plans.
C. Air handling unit or fans not operated without specified filters properly installed.

3.02 **INSTALLATION, DUST COLLECTOR**

A. Mount unit on extension legs provided with unit and anchor legs to floor.
B. Place barrels under hopper and install barrel top adapter with gaskets.
C. Install flexible connection at air discharge only.
    1. Install with 1-inch space between the discharge unit and discharge duct, with fabric snug but not stretched tightly. No flexible connection installed on inlet.
    2. Provide accurate alignment between unit and ductwork.
    3. Secure flexible connection in place with flanged connections. Do not crimp into the duct construction. Ends of the screws not to project into the duct more than 1/8-inch.

3.03 **PROTECTION**

A. Equipment Operation During Construction:
    1. Pleated Filters:
        a. If air handlers are operated during construction, replace filters periodically as required to prevent dirt carryover.
        b. Install clean filters prior to air balancing.

END OF SECTION

SECTION 23 5500

FUEL FIRED HEATERS

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes:

1. Direct Gas-Fired Make-Up Air Unit (MAU)

1.02 RELATED SECTIONS

A. Division 01, General Requirements
B. Division 23, Heating, Ventilating, and Air Conditioning (HVAC)

1.03 SUBMITTALS

A. Submit the following:

1. Shop drawings showing details of construction, dimensions, arrangement of components, isolation, filters, etc.w
2. Product data showing performance data, standard items and accessories, operating weight.
3. Operating and Maintenance Data

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Direct Gas-Fired Make-Up Air Unit (MAU):

1. Greenheck
2. Rupp
3. Applied Air
4. Trane
5. Reznor
6. Rapid
7. Weather-Rite
8. Gaylord
9. Cambridge
10. Hastings
11. Modine
12. Bananza
13. Other Manufacturers: Submit substitution request.

2.02 DIRECT GAS-FIRED MAKE-UP AIR UNIT (MAU)

A. Description:

1. Single zone direct fired unit consisting of filter section, fan section, and heating section contained in an insulated steel casing mounted on a common steel base.
2. Arrange components in order indicated above.
3. Unit to be ETL listed to ANSI Standards.

B. Unit Casing:

1. Casing of 16 gauge steel, reinforced and braced.
2. Caulk and seal seams to make unit water and air tight.
3. Support unit on continuous steel supports with intermediate angle and channel framework.
4. Provide access for inspection of fan and motor, filters, dampers and other components.

5. Provide continuous perimeter of closed cell neoprene gasket to form an air tight seal.
6. Manufacturer's standard factory finish.
7. Insulation of walls, bottom and top minimum 1-inch thick rigid fiberglass.

C. Fans, Motors and Drives: Double width, double inlet centrifugal fans with forward curved wheels.
D. Vibration Isolation: Provide as integral part of fan and motor assembly with 1-1/2-inch static deflection isolators and provide flexible connections between fan and casing.
E. Filters: Medium efficiency pleated filters, Farr 30/30, or equal.
F. Dampers: Provide multi-blade inlet damper.
G. Burner:

1. Modulating type specifically designed to burn natural gas below the maximum non-contaminating level required by OSHA.
2. Non-clogging, stainless steel baffles.
3. 25 to 1 turndown ratio with 100 percent thermal efficiency.
4. Constant air velocity across burner.
5. Suitable for 2 psi gas service.
6. Provide gas PRV as required.

H. Gas Safety Controls:

1. Provided to meet IRI requirements and include a flame safeguard relay with ultraviolet flame sensing.
2. Automatic and manual high temperature limits are to be provided at the discharge of the unit and a high temperature safety located at the burner.
3. Provide firestats at the supply air.
4. Ajustable outside air cutoff provided to shutoff gas when outside air temperatures exceed 65 degrees F.

I. Gas Temperature Controls:

1. Electronic with accuracy to ±0.2 degrees F.
2. Nominal turndown ratio, 25:1 with total control between high and low fire.
3. Provide unit with pre-purge time delay and arranged for positive low-fire startup.

J. Include burner, gas regulator, blower and damper service switches in the electrical compartment to provide manual operation of the unit and provide a remote operating console with a summer/winter/off switch, burner and blower lights, a safety alarm light and a remote temperature selector.
K. Remote Control Panel: Contain standard electrical component such as the following:

1. Fused Disconnect Switches
2. Motor Starters
3. 24V Transformers
4. Control Circuit Fuses Flame Relay
5. Low Temperature Limit Switch
6. High Temperature Limit Switch
7. Low Gas Pressure
8. Coded Terminal Strip
9. Safety and Operating Pilot Lights

L. Electrical: Internally wired for single point electrical connection in accordance with NEC.

M. Controls:

1. Provide summer/winter/off switch on face of remote control panel. In summer mode, fan runs continuously, heat is off. In winter mode, fan runs continually and space temperature through discharge air temperature monitor modulates the gas burner to maintain space temperature.
2. Unit shall be interlocked with spray booth operation, and shall run only when spray booth fan is running.
3. Unit shall be shut down when dry chemical fire suppression system is activated.
4. When the unit runs, open outside air damper.
5. Interlock unit with spray booth fan. .
6. During OFF mode, stop fan and close damper.

PART 3 EXECUTION

3.01 **MAKE-UP AIR UNIT**

A. Support from roof curb. Coordinate with other divisions. Install with air filters in place before operating unit.

B. Startup:

1. General: Comply with manufacturer's instructions.
2. Startup of units provided under the direct supervision of the manufacturer's representative with factory trained personnel.

C. Testing and Adjusting/Performance Test:

1. Except where initial unit operation clearly shows the performance meets or exceeds the requirements, test to show compliance.
2. Tests performed by the manufacturer's representative in the presence of the Engineer.

D. Provide controls and field wiring of controls for a complete installation.

END OF SECTION

SECTION 26 01 26
SUBMITTALS AND SHOP DRAWINGS

PART 1 GENERAL

1.01 REQUIREMENTS

A. Refer to General Divisions for submittal requirements and procedures.

1.02 DEFINITIONS

A. Manufacturer's Product Data: Manufacturer's product data consist of one or more levels of manufacturer's information as described below and as requested in the submittal schedule. The three levels of information include: manufacturer's list, manufacturer's catalog data, and manufacturer's technical and engineering data.

1. Manufacturer's List: Manufacturer's list shall include a typewritten list of manufacturer's name, sizes and model or catalog numbers, referenced to the specification section.
2. Manufacturer's Catalog Data: Manufacturer's catalog data shall include standard catalog information marked to indicate specific equipment proposed and point of operation, if appropriate. Include installation instructions.
3. Manufacturer's Technical and Engineering Data: Manufacturer's technical and engineering data shall include materials, dimensions, details, installation instructions, weights, capacities, illustrations, wiring diagrams, control diagrams, piping diagrams, connection diagrams, performance data (including performance curves), mix design, and any other information required for a complete and thorough evaluation of the equipment or items specified, and to verify compliance with specifications. Control diagrams or control schematics, where specified and required by the submittal schedule, shall include a detailed schematic of the proposed control modifications and their interface with existing control equipment, where appropriate, and a manufacturer and model number listing of all proposed control components shown on the control schematic.

B. Shop Drawings: Shop drawings are construction drawings of items manufactured specifically for this project. Shop drawings include dimensions, construction details, weights, and additional information to identify the physical features of the system or piece of equipment.

C. Samples: Samples illustrate functional characteristics of the product with integral parts and attachment devices. Samples shall allow evaluation of full range of manufacturer's standard colors, textures, and patterns.

D. Certificates, Test Data or Other Information: Requirements for certificates, test data, or other information will be listed under referenced specification sections.

1.03 SUBMITTALS REQUIRED

A. Product Evaluation Data. The submittal schedule for product evaluation data is as indicated below. Each item requiring a submittal is given the following code:

1. Manufacturer's list
2. Manufacturer's catalog data
3. Manufacturer's technical and engineering data
4. Shop drawings
5. Samples
6. Certificates
7. Test data
8. Worker's qualifications

9. See individual sections for special requirements

1.04 SUBMITTAL SCHEDULE

Division 26 – Electrical	Codes
Section 26 24 16 – Panelboards	1,2,3,4
Section 26 27 26 - Wiring Devices	1,2
Section 26 28 16 - Overcurrent Protective Devices	2,3
Section 26 29 13 - Motor and Circuit Disconnects	2,3
Section 26 51 13 - Indoor Lighting Fixtures, Lamps, and Ballasts	2,3,4

PART 2 PRODUCTS

2.01 THIS PART NOT USED

PART 3 EXECUTION

3.01 THIS PART NOT USED

END OF SECTION

SECTION 26 05 00
COMMON WORK RESULTS FOR ELECTRICAL

PART 1 GENERAL

1.01 CONTRACT DOCUMENTS

A. The Contract Documents are complementary. What is required by any one, as affects this Division, shall be as binding as if repeated herein.

B. Separation of this Division from other Contract Documents shall not be construed as complete segregation of the Work.

C. Particular attention is called to Advertisement For Bids, Instructions to Bidders, Supplemental Instructions to Bidders, General Conditions, Supplemental General Conditions, Drawings and Specifications, and modifications incorporated in the documents before execution of the Agreement.

1.02 SCOPE OF WORK

A. General: Provide and install complete and satisfactorily operating electrical systems as specified in this Division, as shown on Drawings, as required, and as reasonably intended. Work generally includes, but is not limited to electrical distribution, lighting, devices, wiring systems and control systems.

B. Omissions: Omission of expressed reference to any item of labor or material necessary for the proper execution of the work shall not relieve responsibility from providing such additional labor or material.

1.03 EXAMINATION OF SITE

A. Examine Site of Work before making Bid and ascertain all related physical conditions.

B. Field verify scale dimensions shown since exact locations, distances and levels will be governed by actual field conditions.

C. Owner will not be responsible for any loss or unanticipated costs which may be suffered by the successful Bidder as a result of such Bidder's failure to fully inform himself in advance in regard to all conditions pertaining to the Work and character of the Work.

1.04 COORDINATION OF TRADES

A. Check Drawings of other trades to avert possible installation conflicts. Should major changes from original Drawings be necessary to resolve such conflicts, notify Architect and secure written approval and agreement on necessary adjustments before installation is started.

B. Check equipment connections and equipment locations on the job for coordination with other Divisions equipment and connections, structure, and the like.

1.05 MINOR DEVIATIONS

A. Make minor changes in equipment connections and equipment locations as directed or required before rough-in without extra cost.

1.06 SUBSTITUTIONS

A. Equal material of other manufacturer may be used following Architect's approval of a written request submitted at least 7 working days prior to bid date.

1.07 RECORD DRAWINGS

A. Maintain a marked set of prints at job site at all times. Show all changes from contract drawings, whether visible or concealed. Dimension accurately from building lines, floor or curb elevations. Show exact location, elevation, and size of conduit, access panel and doors, and all other information pertinent to the work.

B. At project completion, submit marked set to Architect for approval.

1.08 WARRANTY

A. Warrant all work, materials, and equipment for one year.

PART 2 PRODUCTS

2.01 THIS PART NOT USED

PART 3 EXECUTION

3.01 THIS PART NOT USED

END OF SECTION

SECTION 26 05 01
ELECTRICAL DEMOLITION

PART 1 GENERAL

1.01 SCOPE

A. It is the intent of these documents to provide the necessary information and adjustments to the electrical system required to meet Code and accommodate installation of the new work.

B. Contractor shall coordinate with the Owner so that work can be scheduled not to interrupt operations, normal activities, building access, and access to different areas. The Owner will cooperate to the best of their ability to assist in a coordinated schedule, but will remain the final authority as to time of work permitted.

1.02 EXISTING CONDITIONS:

A. The locations of existing utilities and equipment are shown in an approximate way only and have not been independently verified by the Owner or its representative. The Contractor shall determine the exact location of all existing utilities before commencing work, and agrees to be fully responsible for any and all damages which might be occasioned by the Contractor's failure to exactly locate and preserve any and all utilities and equipment. Replace damaged items with new material to match existing. Promptly notify Owner if utilities are found which are not shown on the drawings.

PART 2 PRODUCTS

2.01 MATERIALS

A. All materials accumulated during the demolition process are the Owner's property and shall be removed from the job site as directed by the Owner.

PART 3 EXECUTION

3.01 DEMOLITION

A. Remove all existing fixtures, clocks, switches, receptacles, and other electrical equipment and devices and associated wiring from walls, ceilings, floors, and other surfaces scheduled for remodeling, relocation, or demolition unless specifically shown as retained or relocated on the Drawings.

B. Disconnect all existing mechanical equipment scheduled for removal, relocation or abandonment. See mechanical Drawings for scope of work. Remove abandoned cables and unusable raceways. Relabel panels and motor control centers to reflect changes.

C. Maintain electrical continuity of all existing systems. Remove or relocate electrical boxes, conduit, wiring, equipment, fixtures, etc. as may be encountered in removed or remodeled areas in the existing construction affected by this work. Wiring which serves usable existing outlets shall be removed and restored clear of the construction or demolition. If existing junction boxes will be made inaccessible, or if abandoned outlets serve as feed through boxes for other existing electrical equipment which is being retained, new conduit and wire shall be provided to bypass the abandoned outlets. If existing conduits pass through partitions or ceiling which are being removed or remodeled, new conduit and wire shall be provided to reroute clear of the construction or demolition and maintain service to the existing load.

D. Extend circuiting and devices in all existing walls to be furred out.

E. Existing electrical outlets and light fixtures are denoted by dotted or dashed lines. Verify exact location of existing electrical outlets and light fixtures in the field. Only partial existing electrical shown. Locations of items shown on the Drawings as existing are partially based on as-built and other drawings which may contain errors. The contractor shall verify the accuracy of the information shown prior to bidding and provide such labor and material as is necessary to accomplish the intent of the contract documents.

F. Remove all abandoned wiring to leave site clean.

G. Keep outages to occupied areas to a minimum and prearrange all outages with the Owner's representative. Requests for outages shall state the specific dates and hours and the maximum durations, with the outages kept to these specific dates and hours and the maximum durations. This Contractor will be liable for any damages resulting from un-scheduled outages or for those not confined to the preapproved times. Outages shall take place at times when the facility is not in operation or occupied by non-essential personnel. Include all costs for overtime labor as necessary to maintain electrical services in the initial bid proposal. Temporary wiring and facilities, if used, shall be removed and the site left clean before final acceptance. Requests for outages must be submitted at least (5) days prior to intended shutdown time.

H. No circuit breaker or disconnects shall be turned off without prior approval from Owner. Coordinate with the Owner's representative responsible for the area or equipment affected for any electrical interruptions which affect the operation of the remaining portions of the facility.

I. Verify with the General Contractor a location for storage of materials, supplies, tools, rubbish, etc. prior to start of work.

END OF SECTION

SECTION 26 05 19

LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.01 WORK INCLUDED

A. Wires and Cables

B. Wire Connections

1.02 REFERENCE STANDARDS

A. National Fire Protection Association (NFPA)

NFPA 70 National Electrical Code

1.03 DELIVERY, STORAGE AND HANDLING

A. Deliver new wire to site in new standard coils or reels with approved tag denoting length, wire size, insulation type and manufacturer's name.

B. Protect from weather and damage during storage and handling.

PART 2 PRODUCTS

2.01 CONDUCTOR AND CABLE MATERIALS

A. Building Wiring: 98 percent conductivity copper, 600 volt insulation, stranded. Type THHN for interior dry and damp locations. Type THWN or XHHW for wet and exterior locations.

B. Branch Circuit Wiring: Conductors smaller than No. 12 AWG for power system branch circuits not permitted.

C. Motor control wires shall be No. 14 minimum.

D. Wire for special areas shall be as specified on the Drawings.

2.02 VARIABLE FREQUENCY DRIVE CABLE

A. RoHS compliant, UL listed.

B. Three symmetrical bare copper grounds.

C. Two spiral copper tape shields (100% coverage).

D. Size per VFD manufacturer recommendations.

E. PVC jacketed.

F. Belden symmetrical design or approved.

2.03 TWIST-ON CONNECTOR

A. UL pressure-type, solderless, insulated, wound spring grip twist on connector.

B. Solderless pressure connectors for terminals, taps, and splices.

2.04 COMPRESSION ADAPTER

A. For terminating a single aluminum wire into mechanical connectors, such as a circuit breaker or set screw lugs. Burndy "Hyplug" Type AYP, or equal by Anderson, Illsco, Kearney, Mac-Adapt, T&B.

2.05 TERMINAL, CRIMP-ON

A. Flat, fork tongue, self-insulating

B. For connection of stranded wire to screw terminals

C. T & B "Sta-Kon," or equal

PART 3 EXECUTION

3.01 CONDUCTOR AND CABLE INSTALLATION

A. Make conductor length for parallel feeders identical.

B. Lace or clip groups of feeder conductors at distribution centers, pull boxes, and wireways.

C. Provide copper grounding conductors and straps. A ground wire shall be pulled through conduits and used as the equipment grounding conductor.

D. Install wire and cable in code conforming raceway.

E. No shared neutrals. Provide one neutral for each phase conductor in branch circuits.

F. Use wire pulling lubricant for pulling No. 4 AWG and larger wire. UL approved type only.

G. Install wire in conduit runs after concrete and masonry work is complete and after moisture is swabbed from conduits.

H. Splice only in accessible junction or outlet boxes. Splice in feeders and services not permitted. Splices or taps in branch circuits permitted only in junction boxes where circuits divide.

I. Color code conductors to designate neutral, phase, and ground as follows:

CONDUCTOR	120/208 OR 120/240	277/480
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow
Neutral	White	Gray
Ground	Green	Green

J. Wires shall be factory color coded by integral pigmentation. Colored plastic tape permitted on No. 6 and larger where integral pigmentation impractical. Apply tape in spiral half-lap over exposed portions in manholes, boxes, panels, switchboards and other enclosures.

K. All circuit conductors shall be identified with circuit number at all terminals, intermediate outlets, disconnect switches, circuit breakers, motor control centers, etc. Both ends of a given conductor shall be identified alike.

L. DO NOT install wires of different voltage systems in same raceway, box, gutter or other enclosure.

M. Radius of cable bends shall not be less than 10 times the outer diameter of the cable.

3.02 CONNECTIONS AND SPLICES

A. Follow manufacturer's instructions using manufacturers recommended tools.

B. Stripping Insulation: Carefully strip, avoid nicking conductor. No "ringing."

C. Design: Connectors shall be designed and approved for the purpose used. Connectors between aluminum and copper shall be listed "AL/CU" for the purpose of preventing electrolytic action.

D. Bare Connectors and Conductor Free Ends: Wrap with insulating rubber or friction tape to equivalent insulation of wire.

E. Ground Continuity to Metallic Surfaces: Remove any paint coating and polish surface beneath connection.

F. Copper conductors may be terminated in any approved compression or mechanical connector, including set screws.

G. No splices or taps permitted in feeder or branch circuit terminating in a single outlet.

H. Branch circuit splices and taps in junction and outlet boxes: Twist-on connectors.

I. Conductor and cable copper shall not be reduced at the terminal for making connections.

J. Slack shall be left at equipment, pullboxes, or outlet boxes to allow for a neat termination.

END OF SECTION

SECTION 26 05 26
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Electric and power system grounding

B. Communication system grounding

1.02 REQUIREMENTS OF REGULATORY AGENCIES

A. Provide grounds in accordance with National Electrical Code and additional requirements as required herein.

PART 2 PRODUCTS

2.01 GROUNDING CONDUCTORS

A. Size: Equipment grounding conductor: Table 250-122.

B. Material: Copper

C. Protection: Conductors not in raceway or concealed shall be insulated. Provide conduit where shown or required for physical protection.

D. Bonding Jumpers: Same requirements

PART 3 EXECUTION

3.01 POWER SYSTEM GROUNDING

A. Circuit Grounding: Install grounding bushings, studs, and jumpers at distribution centers, pullboxes, motor control centers, panelboards, and junction boxes.

B. Ground Connections: Clean surfaces thoroughly before applying ground lugs or clamps. If surface is coated, the coating must be removed down to the bare metal. After the coating has been removed, apply a noncorrosive approved compound to cleaned surface and install lugs or clamps. Where galvanizing is removed from metal, it shall be painted or touched up.

C. Conduit Systems:

1. Ground all metallic conduit systems.
2. Non-metallic conduit systems shall contain a grounding conductor.
3. Conduit provided for mechanical protection containing only a grounding conductor, bond to that conductor at the entrance and exit from the conduit.

D. Feeders and Branch Circuits: Install green grounding conductors with feeders and branch circuits as follows:

1. Feeders
2. Circuits serving preparation and kitchen equipment
3. Receptacle outlets
4. Directly connected laboratory equipment
5. Motors and motor controllers
6. Fixed equipment and appliances
7. Items of equipment where the final connection is made with flexible metal conduit shall have a grounding wire.
8. Additional locations and systems as shown

E. Boxes, Cabinets, Enclosures, and Panelboards:

1. Bond the grounding wires to each pullbox, junction box, outlet box, cabinets, and other enclosures through which the ground wires pass (except for special grounding systems for intensive care units and other critical units shown.
2. Provide lugs in each box and enclosure for ground wire termination.
3. Provide ground bars in panelboards, bolted to the housing, with sufficient lugs for terminating the ground wires.

F. Receptacles - Refer to Section 26 27 26 – WIRING DEVICES.

G. Ground lighting fixtures to the green grounding conductor of the wiring system when the green ground is provided; otherwise, ground the fixtures through the conduit systems. Fixtures connected with flexible conduit shall have a green ground wire included with the power wires from the fixture through the flexible conduit to the first outlet box.

END OF SECTION

SECTION 26 05 29
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Raceway Supports

PART 2 PRODUCTS

2.01 RACEWAY SUPPORTS

A. Single Runs: Steel rod hangers, galvanized single hole conduit straps, or ring bolt type hangers with specialty spring clips. Plumbers perforated tape or "J-nails" not acceptable.

B. Multiple Runs: Conduit rack with 25 percent spare capacity. Maximum width per manufacturer's recommendations.

C. Vertical Runs: Channel support with conduit fittings.

D. All hardware such as inserts, straps, bolts, nuts, screws and washers shall be galvanized or cadmium-plated steel.

2.02 ANCHOR METHODS

A. Hollow Masonry and Framed Walls: Toggle bolts or spider type expansion anchors

B. Solid Masonry: Lead expansion anchors or preset inserts

C. Metal Surfaces: Machine screws, bolts, or welded studs

D. Wood Surfaces: Wood screws

E. Concrete Surfaces: Self-drilling anchors or powder-driven studs

PART 3 EXECUTION

3.01 INSTALLATION

A. Layout to maintain headroom, neat mechanical appearance, and to support equipment loads required.

B. Exact location and spacing between supports per manufacturer's recommendations and NEC requirements as minimum.

C. Conduit shall be installed in such a manner as to prevent the collection of trapped condensation. All runs of conduit shall be arranged so as to be devoid of traps wherever possible.

END OF SECTION

SECTION 26 05 33
RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Conduit, Tubing, and Fittings

B. Flexible Conduit

C. Electrical boxes and fittings as required for a complete installation

1.02 REFERENCE STANDARDS

A. National Fire Protection Association (NFPA)

1. NFPA 70 National Electrical Code--Chapter 3

PART 2 PRODUCTS

2.01 MATERIALS AND COMPONENTS

A. Conduit and Tubing: Galvanized steel rigid threaded conduit, electrical metallic tubing, intermediate metallic conduit.

B. Flexible Conduit: Steel armor, flexible plastic jacketed type with liquidtight connectors (liquidtight flexible metallic conduit).

C. Fittings:

1. General: Approved for purpose. Water, concrete tight where required.
2. Galvanized Rigid Steel Conduit (GRC): Threaded - no pressure type. Bushings with factory insulated throat.
3. Electrical Metallic Tubing (EMT): Connectors and couplings to be case steel. Preinsulated connectors and couplings shall be compression, setscrew type. All connectors shall have insulated throats.
4. Flexible Metallic Conduit: Clamp type, galvanized malleable iron with insulated throat.
5. Liquidtight Flexible Metallic Conduit: Continuous copper ground in core; approved watertight.

D. Expansion Joints: Offset or sliding type with bending straps and clamps. Approved for purpose.

2.02 TYPE

A. Utilize GRC or IMC in concrete with concrete-tight connectors or exterior with watertight connectors.

B. Utilize electrical metallic tubing concealed in interior spaces or exposed in unfinished interior where not subject to physical damage.

C. Utilize surface metal raceways for exposed runs in finished areas. Paint to match wall finish.

D. Make connections to motors and equipment with flexible metallic conduit or liquidtight flexible metallic conduit. Use liquidtight type in damp locations. Minimum size 1/2-inch for motor connections. Use 3/8-inch only for fixture and control wiring. Provide sufficient length of flexible conduit to avoid transmission of vibration. Sizes not noted on the Drawings shall be as required by the NEC.

2.03 OUTLET BOXES

A. Minimum Box: 4-inch box, 1-1/2-inches deep. Provide raised covers on bracket surface mounted outlet and plaster rings on flush outlets.

B. Flush Switch and Receptacle Outlets for One or Two Devices: 4-inch square box, 1-1/2-inches or more deep, with single or two-gang plaster ring.

C. Three or More Devices at One Location: Use one piece gang boxes with device cover. Install one device per gang.

D. Provide galvanized steel interior outlet wiring boxes of the type, shape and size, including depth of box, to suit each respective location and installation; constructed with stamped knockouts in back and sides, and with threaded holes with screws for securing box covers or wiring devices.

E. Provide outlet box accessories as required for each installation, including mounting brackets, wallboard hangers, extension rings, fixture studs, cable clamps and metal straps for supporting outlet boxes, compatible with outlet boxes being used and meeting requirements of individual wiring situations. Choice of accessories is Installer's option.

F. Outlet Box Plate Covers:

1. Flush Mounting: Bevelled, pressure formed, type 302 stainless steel, match device installed.
2. Surface Mounting: Bevelled, steel, pressure formed.

2.04 WEATHERPROOF OUTLET BOXES

A. Provide corrosion-resistant cast metal weatherproof outlet wiring boxes, of the type, shape and size, including depth of box, with threaded conduit ends, cast metal face plate with spring-hinged waterproof cap suitably configured for each application, including face plate gasket and corrosion proof fasteners.

B. Weatherproof boxes to be constructed to have smooth sides, gray finish.

C. Boxes used in contact with soil shall be cast iron alloy with gasketed screw cover and water-tight hubs.

D. Weatherproof Plates: Cast metal, gasketed, for switches and receptacles provide spring loaded doors.

2.05 WEATHERPROOF JUNCTION AND PULL BOXES

A. Provide galvanized sheet steel junction and pull boxes with screw-on covers; of the type, shape and size, to suit each respective location and installation; with welded seams and equipped with stainless steel nuts, bolts, screws and washers.

2.06 PULLBOXES

A. Pullboxes and Junction Boxes: Sheet metal (indoors) or cast metal (exterior or damp locations) construction, conforming to National Electrical Code, with screw-on cover.

B. Flush Mounted Pullboxes: Provide overlapping covers with flush-head retaining screws, finished in light gray enamel.

C. Box volumes shall meet NEC for size and number of entering conduits.

PART 3 EXECUTION

3.01 RACEWAY INSTALLATION

A. Install conduit concealed in all areas excluding mechanical and electrical rooms, connections to motors, connections to surface cabinets, underfloor spaces, and above suspended ceilings.

B. For exposed runs, attach surface mounted conduit with clamps.

C. Coordinate installation of conduit in masonry work.

D. Install conduit free from dents and bruises. Plug ends to prevent entry of dirt or moisture.

E. Clean out conduit before installation of conductor.

F. Alter conduit routing to avoid structural obstructions, minimizing crossovers. Bends and offsets shall be avoided where possible, but when necessary shall be made with an approved hickey or conduit bending machine. The use of a pipe tee or a vise for bending conduit will not be permitted.

G. Provide UL approved expansion fittings complete with grounding jumpers where conduits cross building expansion joints and for long runs where conduit expansion may be excessive. Provide bends or offsets in conduit adjacent to building expansion joints where conduit is installed above suspended ceilings.

H. Route all exposed conduits parallel or perpendicular to building lines.

I. Allow minimum of 6 inches clearance at flues, steam pipes, and heat sources.

J. Vertical Runs: Straight and plumb.

K. Raceways Running in Groups: Run at same relative elevation, properly spaced and supported.

L. Dissimilar Metals: Avoid contact with pipe runs of other systems.

M. Lengths and Bends: Maximum number of bends in any run shall be the equivalent of four quarter bends (360 degrees total). Maximum length of any run shall be 300 feet, less 50 feet for each equivalent quarter bend. Junction and pull boxes shall be provided to maintain these limits.

N. Provide waterproof seal for all exterior wall and underground raceway penetrations.

O. All empty raceways shall be provided with pull string or #12 conductor.

3.02 BOX INSTALLATION

A. Locate outlet boxes flush in areas other than mechanical rooms, electrical rooms, and above suspended ceilings.

B. For boxes mounted in exterior walls, make sure that there is insulation behind outlet boxes to prevent condensation in boxes.

C. Coordinate location and mounting heights with built-in units. Adjust outlet mounting height to agree with required location for equipment served.

D. Locate pullboxes and junction boxes above suspended ceilings or in electrical rooms, utility rooms, or storage areas.

E. Support: Secure boxes independent of entering conduits by attaching directly to structure with bar hanger, blocking, or flat side bracket.

F. Identify each junction and pullbox with system description including branch circuit numbers of enclosed circuits.

G. Conduit shall be securely fastened to all sheet metal outlet, junction, and pullboxes with galvanized locknuts, and bushing.

H. Do not mount boxes back-to-back. Boxes on opposite sides of wall shall be separated by at least 3 inches.

END OF SECTION

SECTION 26 05 53
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Permanent Identification of all electrical system components.

1.02 REQUIREMENTS OF REGULATORY AGENCIES

A. Identification shall conform to the latest edition of the National Electrical Code (NEC), Articles 110-21 and 110-22 as a minimum requirements.

PART 2 PRODUCTS

2.01 MATERIALS

A. Laminated Plastic:

1. Three layer, black front and back with white core.
2. Engraved through outer layer to show white characters on black background.
3. Beveled edges.
4. Other colors as specified.

B. Panelboard Directory Card: Fiberboard neatly typed for newly installed panels. Circuit changes to existing panels shall be noted on the directory card by hand printing in ink. When more than five changes have been made on the directory card, a new card shall be typed.

PART 3 EXECUTION

3.01 ITEMS TO BE IDENTIFIED

A. Motor starters, power panels, lighting panels and the disconnecting devices contained therein.

B. Disconnecting devices that are located in the area and not part of the items listed in 3.01 (A).

C. Control panels, starters, pushbutton stations, pilot lights and other control devices.

D. Transformers.

E. Remote control devices.

F. Conductors at both device and terminal strip terminations for control and instrumentation cables and conductors.

G. Other items as specified or noted.

3.02 USE OF NAMEPLATES AND TAGS

A. Panel designations, as described in paragraph 3.04 (A), and disconnecting devices in motor control centers shall be identified by nameplates that are engraved or etched. Nameplates that are engraved or etched shall have a black background with white letters. Letters for panel designations shall be a minimum of 1/2 inch high and letters for disconnect devices, mentioned in this paragraph, shall be smaller than the panel designation but have a minimum height of 3/8 inch.

B. Disconnect devices in lighting panels and power panels shall be identified on the panelboard directory card.

C. All wiring shall be identified with self-laminating, machine made thermal transfer labels.

3.03 APPLYING NAMEPLATES AND TAGS

A. Nameplates that are engraved or etched, shall be attached with screws.

B. Panelboard directory cards shall be placed in holders, provided for this purpose, located inside the panel doors.

3.04 IDENTIFICATION ON NAMEPLATES AND TAGS

A. The voltage designation shall also be shown on the nameplate.

B. Nameplates for disconnecting devices contained in panels and motor control centers shall show the equipment name and location by floor and column number. Voltage designation shall not be included when the voltage is the same as for the panel or motor control center.

C. Nameplates on disconnect devices located in the area but not part of a panel or motor control center shall have the equipment name, power source identification, and voltage designation. Nameplates for disconnect devices located remotely from the equipment shall also show the equipment location by floor and column number.

D. Nameplates on items listed in paragraph 3.01 (C) shall have the equipment name while the individual switches and lights shall have the function (such as start, stop, on, off, etc.).

E. Panelboard directory cards shall list the circuit numbers and show the equipment name and location supplied by the circuits. Equipment locations shall be shown by floor and column numbers or by room numbers.

END OF SECTION

SECTION 26 09 23
LIGHTING CONTROL EQUIPMENT

PART 1 GENERAL

1.01 WORK INCLUDED

A. Provide lighting control equipment:

1. Automatic wall switches.
2. Motion sensors.

1.02 QUALITY ASSURANCE

A. Minimum Standards:

1. UL 916 Energy Management Equipment.
2. NEMA enclosure standards.

PART 2 PRODUCTS

2.01 AUTOMATIC WALL SWITCH

A. Automatic wall switch shall be completely self-contained and shall replace standard toggle switch. Motion sensor shall sense motion by using both passive infrared, and sound technology.

B. Switch shall sense motion in room and switch 120 or 277 V electronic or magnetic ballasts using zero crossing circuitry.

C. Time delay and sensitivity shall be adjustable.

D. Switch shall be immune to RFI, EMI, and voltage fluctuations.

E. Switch shall have manual on / automatic off mode.

F. Switch shall not require a neutral connection.

G. Acceptable products: Sensorswitch WSD-PST with switch or approved.

2.02 ULTRASONIC CEILING MOTION SENSOR

A. Motion sensor shall sense motion by using ultrasound sensor.

B. Time delay and sensitivity shall be adjustable.

C. Acceptable products: Novitas 01-100 or approved.

2.03 DUAL ULTRASONIC / INFRARED CEILING MOTION SENSOR

A. Motion sensor shall sense motion by using passive infrared and ultrasound sensors.

B. Time delay shall be adjustable.

C. Sensor shall be immune to false activation due to air movement.

D. Switch shall be immune to RFI, EMI, and voltage fluctuations.

E. Acceptable products: Sensorswitch CM-PDT, Unenco CU15000 2000 or approved.

2.04 WALL SWITCH DIMMER

A. Switch to be fully compatible with ballast / fixtures to be controlled

B. Switch shall be slide style with integral on/off control.

C. Switch shall have locator LED that illuminates when load is off.

D. Switch shall have decora style faceplate.

1. Finish to match other wall switched on project.

E. Acceptable product: Leviton, Hunt Dimming, Lutron, or approved.

PART 3 EXECUTION

3.01 INSTALLATION

A. System shall be installed as shown on Drawings.

B. Motion sensor manufacturer shall verify Drawings to ensure coverage is adequate.

C. At Owner's request, return once within 60 days to adjust sensitivity of all motion sensors and to adjust programming of lighting control system.

3.02 WARRANTY

A. Light level sensors, automatic wall switches, and ceiling motion sensors shall have a 5 year warranty.

END OF SECTION

SECTION 26 24 16

PANELBOARDS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Provide panelboards incorporating switching and protective devices of the number, rating and type specified herein and shown in Panel Schedules.

1.02 REFERENCE STANDARDS

A. American National Standards Institute (ANSI).
   1. 67 Panelboards (ANSI/UL 67).
   2. C37.20 Switchgear Assemblies Including Metal-Enclosed Bus (ANSI/IEE C37.20).

B. Institute of Electrical and Electronics Engineers (IEEE).
   1. Std. 141-76 Electric Power Distribution for Industrial Plants.
   2. Std. 241-74 Electric Systems for Commercial Buildings.

C. National Fire Protection Agency (NFPA).
   1. NFPA 70 National Electrical Code.

D. Underwriters' Laboratory (UL).
   1. U.L. 67 Panelboards.
   2. U.L. 869 Service Disconnects.

1.03 QUALITY ASSURANCE

A. Coordination: Panelboard breakers shall be coordinated with feeder breakers in switchboard.

B. Acceptable Manufacturers: Cutler-Hammer, Square D, Siemens. Additions to existing panelboards shall match or be compatible with existing.

PART 2 PRODUCTS

2.01 CONSTRUCTION

A. Box:
   1. Material: Galvanized code gauge steel.
   2. Size: 20-inch minimum width; 4-inch minimum gutter space on all sides.
   3. Mounting Studs: Minimum 4 interior.
   4. Knockouts: Individual knockouts by manufacturer or field-cut by Contractor. No concentric knockouts.
   5. Finish: Except for box, all exterior and interior steel surfaces properly cleaned and finished with industry standard gray baked enamel paint over a rust-inhibiting phosphatized primer coating approved by the paint manufacturer, except panelboards exposed in finished spaces shall have factory finish to match adjacent surfaces.

B. Bussing:
   1. Material: Copper
   2. Tap Arrangement: Phase sequence type, permitting a two or three pole breaker to be installed at any location.

3. Short Circuit Bracing: Fully rated, 10,000 amperes RMS symmetrical minimum for 240V AC Panels, and minimum 14,000 amperes RMS Symmetrical for 480V AC Panels, or as otherwise noted.
4. Phase Bussing: Full height without reduction.
5. Neutral Bussing:
   a. Full size, unless otherwise noted.
   b. Suitable lug for each outgoing feeder requiring a neutral connection.
6. All bolts used to connect current-carrying parts together shall be accessible for tightening from the front of the panel.
7. Wiring terminals: Compression or set screw type for copper conductors; bolted to bus.

C. Trim:
1. Material: Code gauge steel.
2. Flush Panels: 3/4-inch minimum overlap all around.
3. Surface Panels: Same width and height as box.
4. Mountable by screwdriver, without need for special tools.
5. Tamper-proof: Trim shall not be removable with door closed. Adjustable indicating trim clamps shall be concealed inside door.
6. Trim shall have piano hinge down one side and shall be openable by removing crews. Dead front cover shall not open with trim.
7. Doors:
   a. Shall cover all device handles, except panels having individual metal clad externally operable dead front units.
   b. Hinges: Concealed, 5-knuckle, steel.
   c. Over 48-inches in Height: Shall have auxiliary fasteners at top and bottom of door in addition to flush latch (3-point).
   d. Latches:
      i. Flush, not protruding beyond front of door.
      ii. Spring-loaded door pull.
   e. Locks: Equip latches with flush locks keyed alike.

D. NEMA 1 unless otherwise noted or otherwise required per NEC for location installed.

2.02 CIRCUIT BREAKERS

A. Main Breaker:
1. Where required, main breakers shall be individually mounted separate from branch breakers.
2. Covered by a metal plate, except for the operating handle.
3. Connection from the load side to the panel bus shall be bus bar. Insulated wire not permitted.
4. Where used as service disconnect, breaker and panelboard shall be listed for use as service entrance equipment.

B. Branch Breakers:
1. Connection to Bus: Bolt-on.

C. Other requirements as noted elsewhere in these Specifications and as per NEC.

PART 3 EXECUTION

3.01 INSTALLATION

A. Provide mounting brackets, busbar drillings, and filler pieces for unused spaces.

B. Prepare and affix typed directory to inside cover of panelboard indicating loads controlled by each circuit as required elsewhere in these Specifications.

C. Provide panelboards flush in areas other than mechanical rooms, electrical rooms, and above removable ceilings.

D. Conduit shall be securely fastened to all panelboards and sheet metal outlet, junction, and pull boxes with galvanized locknuts, and one bushing installed in accordance with standard practice. The full number of threads shall project through to permit the bushing to be drawn tight against the end of the conduit, after which the locknut shall be made up sufficiently tight to draw each into firm electrical contact with the box.

E. Keys: Collect all panel keys. Combine all keys on one key ring and submit at time of Substantial Completion.

F. Provide handle ties per NEC for breakers serving circuits with shared neutral conductors.

END OF SECTION

SECTION 26 27 26
WIRING DEVICES

PART 1 GENERAL

1.01 WORK INCLUDED

A. Wall Switches.

B. Receptacles.

C. Ground Fault Receptacles.

1.02 REFERENCE STANDARDS

A. American National Standards Institute (ANSI).

1. 467 Grounding and Bonding Equipment (ANSI/UL467).
2. 498 Attachment Plugs and Receptacles (ANSI/UL498).
3. C73 Series Dimensions of Attachment Plugs and Receptacles.

B. Federal Specification (FS).

1. W-C-596D and E Specification for Electrical Power Connector, Plug, Receptacle and Cable Outlet.

C. National Electrical Manufacturer's Association (NEMA).

1. WD 1-79 General Purpose Wiring Devices.

D. National Fire Protection Association (NFPA).

1. NFPA 70 National Electrical Code.

E. Underwriters' Laboratory (UL).

1. UL-20 Standard for Snap Switches.

1.03 QUALITY ASSURANCE

A. Receptacles shall be Industry Class 5362.

B. Acceptable Manufacturers: Hubbell, P&S, Sierra, Bryant, Arrow-Hart, Leviton, GE, or approved.

PART 2 PRODUCTS

2.01 MATERIALS

A. Switches: 120/277 Volt. AC Quiet, slow make, slow break design, toggle handle, with totally enclosed case, rated 20 ampere, specification grade. Provide matching two-pole, three-way and four-way switches.

B. Duplex Receptacles: Full gang size, polarized, duplex, parallel blade, U-grounding slot, specification grade, rated at 20 amperes, 125 volts (unless otherwise noted), designed for split feed service.

C. Ground Fault Receptacles: Specification grade duplex receptacle with integral ground fault circuit interrupter. Test and reset buttons. Matching wall plate.

D. Wall Plates: Satin stainless steel, Type 302. Nominal .040-inch thick. Match device configuration.

E. Nameplates: Provide engraved or embossed plastic nameplates for receptacles other than standard duplex receptacles indicating voltage, phase, amperes, circuit and panel.

F. Color: Provide gray switches and receptacles in all areas.

PART 3 EXECUTION

3.01 INSTALLATION

A. Furnish and install wiring devices of number, rating and type shown.

B. Devices to include appropriate outlet box, cover, wall plate and other necessary installation materials for a complete operating outlet.

C. Mount switches 42 inches (to center line of faceplate) above floor except as otherwise noted on the Drawings.

D. Coordinate switch mounting location with architectural detail.

E. Mount receptacles vertically at 15 inches (to bottom of faceplate) above finished floor, with grounding pole at top.

F. Coordinate receptacle height with benches and counters.

G. When mounting receptacle above bench or counter. Mount horizontally with grounding pole at left.

H. Back wiring wells may be used for receptacles.

I. Grounding: Install a separate green or bare wire between the receptacle strap grounding (green) screw and a screw into the outlet box. Self-grounding strap not approved as grounding means.

END OF SECTION

SECTION 26 28 16
OVERCURRENT PROTECTIVE DEVICES

PART 1 GENERAL

1.01 WORK INCLUDED

A. Fuses.

B. Circuit Breakers.

1.02 REFERENCE STANDARDS

A. Institute of Electrical and Electronic Engineers, Inc. (IEEE).

1. 20-73 Low Voltage AC Power Circuit Breakers Used in Enclosures (ANSI C37.13- 73).

B. National Electrical Manufacturer's Association (NEMA).

1. FU-1 Low Voltage Cartridge Fuses.

1.03 APPLICABLE REGULATIONS

A. Underwriters' Laboratories (UL).

1. UL 489-72 Molded Case Circuit Breakers and Circuit Breaker Enclosures.
2. UL 198 E Class R Fuses.
3. UL 198.2 High Interrupting - Capacity Fuses, Current Limiting Type.
4. UL 869 Service Disconnects.

B. National Fire Protection Association (NFPA).

1. NFPA 70 National Electrical Code.

PART 2 - PRODUCTS

2.01 FUSES

A. Feeder, Branch Circuit and Service Entrance Fuses: 600 amperes and below, UL Class J or RK1 current limiting type, 600 volt 200,000 ampere interrupting capacity.

B. Motor and Inductive Circuit Fuses: UL class RK5 time delay current limiting type, 600 volt, 200,000 ampere interrupting capacity.

C. Control Circuit Fuses: UL Class J or R current, limiting type, 600V.

2.02 MOLDED CASE CIRCUIT BREAKERS

A. Circuit Breakers:

1. Connection to Bus: Bolt-on.
2. Thermal-magnetic, molded case, with inverse time current overload and instantaneous magnetic tripping unless otherwise shown.
3. Quick-make, quick-break, with tripped indication clearly shown by breaker handle taking a position between ON and OFF.
4. Multi-pole breakers shall have a common internal trip. No handle ties between single pole breakers.
5. Contacts: T-rated, for heavy duty switching applications.
6. Breakers feeding convenience outlets shall have sensitive instantaneous trip settings of not more than 10 times the breaker trip rating to prevent repeated arcing shorts resulting from frayed appliance cords.
7. Additions to existing panelboards and switchboards shall match or be compatible with existing.
8. Where used as service disconnects, breakers shall be listed for use as service entrance equipment.

PART 3 EXECUTION

3.01 FUSE INSTALLATION

A. Label each switch to indicate type and rating of fuse installed.

B. All fuses shall be selected to provide selective system coordination.

C. Provide 10% (3 minimum) spare fuses of each size and rating used.

3.02 CIRCUIT BREAKER INSTALLATION

A. Label each breaker located in switchboard or separate enclosure to indicate load served.

B. Adjust settings on breakers to operate properly under actual field conditions and to provide selective system coordination.

C. Update directory in panelboards which have new breakers installed.

END OF SECTION

SECTION 26 29 13
MOTOR AND CIRCUIT DISCONNECTS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Provide and install motor disconnects as shown and as required by Codes.

B. Provide and install circuit disconnects as shown and as required by Codes.

C. Disconnects to include mounting stands, brackets, plates, supports, and required hardware and accessories for complete installation.

1.02 REQUIREMENTS OF REGULATORY AGENCIES

A. Conform to National Electrical Code and to applicable inspection authority.

B. Provide circuit and motor disconnects in the proper enclosure as required by NEC for the location installed unless more stringent requirements otherwise noted on the Drawings or herein.

1.03 REFERENCE STANDARDS

A. Underwriters' Laboratory (UL).

1. UL-98 Enclosed Switches.

B. National Electrical Manufacturer's Association (NEMA).

1. NEMA KS-1 Enclosed Switches.

PART 2 PRODUCTS

2.01 COMPONENTS

A. Motor and circuit disconnects shall have an Underwriters' Laboratory label.

B. Three-Phase Disconnect Switches: Three-pole heavy duty quick make, quick break 600 volt. Number of poles and ampacity as noted or required by Code. Fusible where noted with fuse clips suitable for dual element fuses unless current limiting fuses are noted. Short circuit rating sufficient to withstand the available fault current or let-through current before the fuse melts without damage or changes in rating.

C. Compression or set-screw lugs approved for use with copper wire.

D. ON/OFF Positions: Clearly marked, lockable in "OFF" position.

E. Cover Interlock:

1. Prevents switch from being opened when "on."
2. Prevents closing switch when cover is open.
3. Defeater to permit authorized personnel to open door and inspect switch when "on," or operate with cover open.

F. Enclosure for Dry, Indoor Locations: NEMA 1 minimum. Enclosures for outdoor locations: NEMA 3R minimum. Others as required for location installed.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install motor and circuit disconnects as recommended by manufacturer and as required by Code and UL.

B. Maintain Code clearances.

C. Provide a nameplate on each motor and circuit disconnect identifying the equipment item served. Where disconnect is to be installed in existing motor control center replace existing nameplate with new nameplate identifying new equipment item served.

END OF SECTION

SECTION 26 51 13
INDOOR LIGHTING FIXTURES, LAMPS AND BALLASTS

PART 1 GENERAL

1.01 WORK INCLUDED

A. This Section includes supply and installation of luminaires, supports and accessories; and supply of plaster frames, trim rings and backboxes for plaster, tile, drywall or concrete ceilings.

B. Provide and install lamps in all light fixtures. Refer to lighting fixture schedule.

1.02 REFERENCE STANDARDS

A. National Electrical Manufacturer's Association (NEMA).

1. NEMA LE1: Fluorescent Luminaires.
2. NEMA SSL: LED.

1.03 COORDINATION

A. Confirm compatibility and interface of other materials with luminaire and ceiling system. Report discrepancies to the Engineer/Architect, and defer ordering until clarified.

B. Supply plaster frames, trim rings and backboxes to other trades.

C. Coordinate with Division 23 to avoid conflicts between luminaires, supports, fittings, and mechanical equipment.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Refer to Fixture Schedule.

2.02 BALLASTS

A. Linear Fluorescent Electronic Ballast

1. Program start, universal voltage, extreme system
2. THD < 10%
3. Ballast Power Factor > 99%
4. 0 degree F minimum lamp starting temperature
5. Operating input voltage +/- 20%
6. Operating input frequency 50/60 Hz
7. Audible noise rating “A” or better
8. Output frequency > 40 KHz with no visible flicker
9. Lamp current crest factor < 1.5
10. Constant light output for line voltage variation of +/- 10%
11. Ballast factor 0.71
12. No PCBs
13. 5 year warranty + $15.00 labor allowance.
14. Meets FCC Class A specifications for EMI/RFI
15. Meets ANSI C62.41 Cat A for transient protection
16. UL listed
17. Acceptable product: Osram Sylvania Xtreme System Low Ballast Factor, Advance, or approved.

B. Compact Fluorescent Electronic Ballast

1. Program rapid start
2. THD < 10%
3. Ballast Power Factor > 99%
4. 0 degree F minimum lamp starting temperature
5. Operating input voltage +/- 10%
6. Operating input frequency 50/60 Hz
7. Audible noise rating “A” or better
8. Output frequency > 25 KHz with no visible flicker
9. Lamp current crest factor < 1.5
10. Constant light output for line voltage variation of +/- 10%
11. Ballast factor > 0.95
12. No PCBs
13. 5 year warranty + $10.00 labor allowance
14. Meets ANSI C62.41 Cat A for transient protection
15. UL listed (Osram/Sylvania)
16. Acceptable product: Sylvania Quicktronic Professional or approved

2.03 LUMINAIRES

A. Prime coat and finish in high reflectance baked white enamel, two coats minimum on exposed and reflective surfaces, giving reflectance of 85 percent. Paint after fabrication.

B. Reflective plates: 22-gauge (0.80 mm) metal.

C. Provide 20-gauge (0.90 mm) steel housing.

D. Provide Hinged Frames with Catches; removable for cleaning without tools. Support lay-in lenses on four sides with flip ends on short dimension.

E. Provide gasketing, stops, and barriers to form light traps and prevent light leaks.

F. Design luminaire to dissipate ballast and lamp heat.

G. Use formed or ribbed backplates, endplates, reinforcing channels.

H. Suitable for mounting on low density ceilings, where applicable.

2.04 RECESSED LUMINAIRES

A. Recessed Incandescent Luminaires: Prewired type with junction box forming an integral part of the assembly.

B. Supply recessed luminaire complete with trim type required for ceiling system installed. Before ordering, confirm ceiling construction details and architectural finish for each area.

2.05 LED LUMINAIRES

A. General

1. LED light fixtures shall be in accordance with IES, NFPA, UL, as shown on the drawings, and as specified.
2. LED light fixtures shall be Reduction of Hazardous Substances (RoHS)-compliant.
3. LED drivers shall include the following features unless otherwise indicated:
   a. Minimum efficiency: 85 percent at full load.
   b. Minimum Operating Ambient Temperature: -20°C (-4°F).
   c. Input Voltage: 120 - 277V (±10%) at 60 Hz.

d. Integral short circuit, open circuit, and overload protection.

e. Power Factor: ≥ 0.95.

f. Total Harmonic Distortion: ≤ 20%.

4. LED modules shall include the following features unless otherwise indicated:

a. Comply with IES LM-79 and LM-80 requirements.

b. Minimum CRI 80 and color temperature 4000˚K unless otherwise specified in LUMINAIRE SCHEDULE.

c. Minimum Rated Life: 50,000 hours per IES L70.

d. Light output lumens as indicated in the LUMINAIRE SCHEDULE.

B. LED Downlights:

1. Housing, LED driver, and LED module shall be products of the same manufacturer.

C. LED Troffers:

1. LED drivers, modules, and reflector shall be accessible, serviceable and replaceable from below the ceiling.

2. Housing, LED driver, and LED module shall be products of the same manufacturer.

D. Supply recessed luminaire complete with trim type required for ceiling system installed. Before ordering, confirm ceiling construction details and architectural finish for each area.

2.06 PENDANTS/CABLE HANGERS

A. Swivel sockets permitting normal fixture motion and self-adjustment. Adjustable to provide fixture height alignment.

B. One piece, white finish, with matching canopies.

C. Fixtures shall be factory counter-weighted and balanced to provide level hanging. Weights shall not be visible.

D. Cable hangers shall be adjustable for a minimum of 18”.

2.07 LAMP TYPE AND COLOR

A. Refer to Lighting Fixture Schedule.

B. All lamps of each type and color shall be by the same manufacturer.

2.08 LINEAR FLUORESCENT LAMPS

A. Low mercury, TCLP compliant, 85 CRI, 4100K color temperature.

B. Minimum of 3000 Initial Lumens.

C. Acceptable manufacturers: Osram Sylvania F032/850/XP/ECO, GE, Philips.

2.09 COMPACT FLUORESCENT LAMPS

A. Low mercury, TCLP compliant 81 CRI, 4100K color temperature.

B. Acceptable manufacturers: GE, Philips, Osram Sylvania.

PART 3 EXECUTION

3.01 COORDINATION

A. Refer to Reflected Ceiling Plans for exact locations with respect to ceiling construction.

B. Consult Finish Schedule for ceiling and wall construction and finish.

C. Prior to ordering lighting fixtures, coordinate style of mounting with ceiling construction and trim details for ceiling system finally selected.

3.02 SURFACE MOUNTING

A. Attach with means that will draw fixtures snugly to finished surface without bending or tipping. Twist-on clips with studs not allowed on exposed "T" grid ceilings, except where specified. Support from channel above ceiling framing members with bolt at each corner of fixture.

3.03 PENDANTS

A. Support from structure per paragraph titled “SUPPORT”.

B. Provide steel, stranded safety cable between fixture and structure to support fixture in the event of a pendant breakage.

3.04 SUPPORT

A. Suspended ceiling:

1. Positively attach all light fixtures to the suspended ceiling system. The attachment device shall have a capacity of 150% of the lighting fixture weight acting in any direction.
2. Support grid with No. 12 minimum gage hangers attached to the grid members within 3 inches of the corner of each fixture, attached to structure above.
3. Attach two No. 12 minimum hangers from the fixture housing to the structure above. These wires may be slack.
4. Where suspended fixtures do not align with grid, provide “bridging” above grid and support from structure.
5. Support pendent-hung lighting fixtures directly from the structure above with No. 9 minimum wire or approved alternate support.

B. Support all other fixtures from structure by method rated at least five times support weight.

3.05 ACCESS

A. Recessed fixtures shall have code accessible supply. Use reach-through type fixtures in non-accessible ceilings or other suitable means. Coordinate with ceiling installer.

3.06 FIRE RATED CEILINGS

A. Where a ceiling carries a fire rating, recessed fixtures shall carry UL rating for use in protective enclosures. Coordinate installation of protective enclosures to provide sufficient air space for heat dissipation. 3 inch minimum all around.

3.07 CLEAN-UP

A. At time of acceptance, fixtures and lamps shall be clean, with visible labels removed. Touch-up any blemishes.

B. Remove ballast leakage and dispose of cleaning materials in accordance with EPA regulations.

3.08 FIXTURES AS RACEWAYS

A. Code Reference: NEC 410-31.

B. Through-Wiring: In continuous rows of fluorescent lighting, a connection to a single point in the row indicates that the branch circuit conductors are to be routed through the fixture wiring compartments and a connection made to each ballast.

3.09 LAMP INSTALLATION

A. Install lamps in accordance with manufacturer's instructions.

3.10 EXTRA STOCK

A. Provide extra lamps of all types, based on initial lamping quantity: Incandescent 25%, all others 10%. Where a fraction occurs, round up to next larger integer.

3.11 BURNOUT REPLACEMENT

A. Make replacements from extra stock as required until 90 days after Substantial Completion date. Deliver remaining lamps to Owner.

END OF SECTION