Invitation to Bid

Jefferson Heating System Upgrade

1.1 PROJECT INFORMATION

A. Notice to Bidders: Qualified bidders are invited to submit bids for Project as described in this Document according to the Instructions to Bidders.
B. Project Identification: Sentinel High School Building 500 Mechanical Upgrade
C. Owner: Missoula County Public Schools, 215 S. 6th St W., Missoula, MT 59801.
D. Owner's Representative: Hulteng CCM, Inc. 6417 Trade Center Ave., Billings, MT 59101.
E. Project Engineer: JM Engineering, PLLC, 812 Toole Avenue, Suite E, Missoula, MT 59802
F. Project description: Heating System Upgrade
G. Construction Contract: Bids will be received for the following Work:
    1. General Contract (all trades).
    2. BID SUBMITTAL AND OPENING
        a. Owner will receive sealed bids until the bid time and date at the location indicated below. Owner will consider bids prepared in compliance with the Instruction to Bidders issued by Owner, and delivered as follows:
        b. Bid Date: June 11, 2020
        c. Bid Time: 3:00 pm, local time.
        d. Location: Office of Burley McWilliams, Business Building, 915 South Avenue W., Missoula, MT.
    3. Bids will be thereafter publicly opened and read aloud.
H. BID SECURITY
    1. Bid security shall be submitted with each bid in the amount of 10 percent of the bid amount. No bids may be withdrawn for a period of 30 days after opening of the bids. Owner reserves the right to reject any and all bids and to waive informalities and irregularities.
I. PREBID CONFERENCES
    1. One prebid conference for all bidders will be held at Jefferson School on June 4, 2020 at 2:00 PM, local time. Prospective Bidders are strongly encouraged to attend this conference.
J. DOCUMENTS
    1. Printed Procurement and Contracting Documents: May be obtained by Bidders, Sub-bidders, and Suppliers upon Request. Obtain after May 8th by contacting JM Engineering, PLLC. Documents will be provided to prime bidders only, only complete sets of documents will be issued.
    2. Deposit: $200.00
    3. Additional Shipping charges will apply.
    4. Online Procurement and Contracting Documents: Obtain access after May 27, 2020, by contacting Builders Exchange, or MCPS Facilities. Online access will be provided to all registered bidders and suppliers.
K. TIME OF COMPLETION AN D LIQUIDATED DAMAGES
    1. Bidders shall begin the Work on receipt of the Notice to Proceed and shall complete the work within the Contract Time as outlined in the Preliminary Schedule. Work not completed by the schedule deadlines is subject to Liquidated Damages described in the Project Manual.
L. BIDDERS QUALIFICATIONS
    1. Bidders must be properly licensed under the laws governing their respective trades and be able to obtain insurance and bonds required for the Work. A performance Bond, a separate Labor and Material Payment Bond, and Insurance Coverage in a form acceptable to Owner will be required of the successful bidder.
M. MONTANA PREVAILING WAGE RATE
    1. The selected Bidder will be required to comply with those Rates adopted and effective at the time of signing the Agreement. The State of Montana Wage Rates / Schedule have been included by reference. The full text for rates and compliance can be found on the State of Montana Department of Labor website. Or contact Montana Department of Labor and Industry at 406-444-5600.
N. MONTANA GROSS RECEIPTS TAX
    1. The State of Montana 1% Gross Receipts Tax applies to this project.

BID FORM

PROJECT: MISSOULA COUNTY PUBLIC SCHOOLS
JEFFERSON SCHOOL
HEATING SYSTEM REPLACEMENT
MISSOULA, MONTANA

TO: MISSOULA COUNTY PUBLIC SCHOOLS
ATTN: BURLEY MCWILLIAMS
915 SOUTH AVENUE WEST
MISSOULA, MT 59801

BID FROM: _____

_____

I have received the documents titled Project Manual for Missoula County Public Schools, Jefferson School Heating System Replacement. I have also received Addenda Nos. _____, and have included their provisions in my Bid. I have examined both the documents and the site and submit the following Bid.

In submitting this Bid, I agree:

1. To hold my bid open until July 10th, 2020.
2. To accept the provisions of the Instructions to Bidders regarding disposition of Bid Security.
3. To enter into and execute a Contract, if awarded on the basis of this Bid and to furnish all bonds and insurance required by the bidding documents.
4. To accomplish the work in accordance with the Contract Documents.
5. I certify that I am not presently working beyond the contract time including and authorized extensions of time on any previously awarded public contract in the State of Montana (MT).

BASE BID:

I will perform all of the Work in the base bid, for the lump sum price of:

_____Dollars

Base Bid and accepted Alternate Work must be completed prior to August 30th, 2020

Initial Here: _____

As part of this proposal, the Contractor acknowledges that each employee on the project will comply with the Rules of On-Site Conduct Policy for Missoula County Public Schools.

Initial Here: _____

I have attached the required Bid Security to this Bid. I understand that if I do not answer the above questions and complete all blank spaces provided, my bid may be rejected as an incomplete bid.

Respectfully Submitted

Date: _____ By: _____

Contractor

_____

Signature

_____

Title

_____

Business Address

_____

Montana Public Contractor's License No.

AIA® Document A701™ – 1997

Instructions to Bidders

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

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

THE OWNER:
(Name, legal status and address)

THE ARCHITECT:
(Name, legal status and address)

TABLE OF ARTICLES

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ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement or Invitation to Bid, Instructions to Bidders, Supplementary Instructions to Bidders, the bid form, and other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications and all Addenda issued prior to execution of the Contract.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201™, or in other Contract Documents are applicable to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

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

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment or labor for a portion of the Work.

ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 The Bidder by making a Bid represents that:

§ 2.1.1 The Bidder has read and understands the Bidding Documents or Contract Documents, to the extent that such documentation relates to the Work for which the Bid is submitted, and for other portions of the Project, if any, being bid concurrently or presently under construction.

§ 2.1.2 The Bid is made in compliance with the Bidding Documents.

§ 2.1.3 The Bidder has visited the site, become familiar with local 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.

§ 2.1.4 The Bid is based upon the materials, equipment and systems required by the Bidding Documents without exception.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 Copies

§ 3.1.1 Bidders may obtain complete sets of the Bidding Documents from the issuing office designated in the Advertisement or Invitation to Bid in the number and for the deposit sum, if any, stated therein. The deposit will be refunded to Bidders who submit a bona fide Bid and return the Bidding Documents in good condition within ten days after receipt of Bids. The cost of replacement of missing or damaged documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the Bidding Documents and the Bidder's deposit will be refunded.

§ 3.1.2 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the Advertisement or Invitation to Bid, or in supplementary instructions to bidders.

§ 3.1.3 Bidders shall use complete sets of Bidding Documents in preparing Bids; neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

§ 3.1.4 The Owner and Architect may make copies of the Bidding Documents available on the above terms for the purpose of obtaining Bids on the Work. No license or grant of use is conferred by issuance of copies of the Bidding Documents.

§ 3.2 Interpretation or Correction of Bidding Documents

§ 3.2.1 The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.

§ 3.2.2 Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the Architect at least seven days prior to the date for receipt of Bids.

§ 3.2.3 Interpretations, corrections and changes of the Bidding Documents will be made by Addendum. Interpretations, corrections and changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon them.

§ 3.3 Substitutions

§ 3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

§ 3.3.2 No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least ten days prior to the date for receipt of Bids. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed substitution would require, shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.3 If the Architect approves a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

§ 3.3.4 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

§ 3.4 Addenda

§ 3.4.1 Addenda will be transmitted to all who are known by the issuing office to have received a complete set of Bidding Documents.

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

§ 3.4.3 Addenda will be issued no later than four days prior to the date for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 Preparation of Bids

§ 4.1.1 Bids shall be submitted on the forms included with the Bidding Documents.

§ 4.1.2 All blanks on the bid form shall be legibly executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in both words and figures. In case of discrepancy, the amount written in words shall govern.

§ 4.1.4 Interlineations, alterations and erasures must be initialed by the signer of the Bid.

§ 4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change."

§ 4.1.6 Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder's refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall make no additional stipulations on the bid form nor qualify the Bid in any other manner.

§ 4.1.7 Each copy of the Bid shall state the legal name of the Bidder and the nature of legal form of the Bidder. The Bidder shall provide evidence of legal authority to perform within the jurisdiction of the Work. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further give the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.

§ 4.2 Bid Security

§ 4.2.1 Each Bid shall be accompanied by a bid security in the form and amount required if so stipulated in the Instructions to Bidders. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. The amount of the bid security shall not be forfeited to the Owner in the event the Owner fails to comply with Section 6.2.

§ 4.2.2 If a surety bond is required, it shall be written on AIA Document A310™, Bid Bond, unless otherwise provided in the Bidding Documents, and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the power of attorney.

§ 4.2.3 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either (a) the Contract has been executed and bonds, if required, have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn or (c) all Bids have been rejected.

§ 4.3 Submission of Bids

§ 4.3.1 All copies of the Bid, the bid security, if any, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder's name and address and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

§ 4.3.2 Bids shall be deposited at the designated location prior to the time and date for receipt of Bids. Bids received after the time and date for receipt of Bids will be returned unopened.

§ 4.3.3 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

§ 4.3.4 Oral, telephonic, telegraphic, facsimile or other electronically transmitted bids will not be considered.

§ 4.4 Modification or Withdrawal of Bid

§ 4.4.1 A Bid may not be modified, withdrawn or canceled by the Bidder during the stipulated time period following the time and date designated for the receipt of Bids, and each Bidder so agrees in submitting a Bid.

§ 4.4.2 Prior to the time and date designated for receipt of Bids, a Bid submitted may be modified or withdrawn by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing over the signature of the Bidder. Written confirmation over the signature of the Bidder shall be received, and date- and time-stamped by the receiving party on or before the date and time set for receipt of Bids. A change shall be so worded as not to reveal the amount of the original Bid.

§ 4.4.3 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids provided that they are then fully in conformance with these Instructions to Bidders.

§ 4.4.4 Bid security, if required, shall be in an amount sufficient for the Bid as resubmitted.

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 Opening of Bids

At the discretion of the Owner, if stipulated in the Advertisement or Invitation to Bid, the properly identified Bids received on time will be publicly opened and will be read aloud. An abstract of the Bids may be made available to Bidders.

§ 5.2 Rejection of Bids

The Owner shall have the right to reject any or all Bids. A Bid not accompanied by a required bid security or by other data required by the Bidding Documents, or a Bid which is in any way incomplete or irregular is subject to rejection.

§ 5.3 Acceptance of Bid (Award)

§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest qualified Bidder provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's own best interests.

§ 5.3.2 The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the low Bidder on the basis of the sum of the Base Bid and Alternates accepted.

ARTICLE 6 POST-BID INFORMATION

§ 6.1 Contractor's Qualification Statement

Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request, a properly executed AIA Document A305™, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted as a prerequisite to the issuance of Bidding Documents.

§ 6.2 Owner's Financial Capability

The Owner shall, at the request of the Bidder to whom award of a Contract is under consideration and no later than seven days prior to the expiration of the time for withdrawal of Bids, furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. Unless such reasonable evidence is furnished, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

§ 6.3 Submittals

§ 6.3.1 The Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, after notification of selection for the award of a Contract, furnish to the Owner through the Architect in writing:

.1 a designation of the Work to be performed with the Bidder's own forces;

.2 names of the manufacturers, products, and the suppliers of principal items or systems of materials and equipment proposed for the Work; and

.3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

§ 6.3.2 The Bidder will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder in writing if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, (1) withdraw the Bid or (2) submit an acceptable substitute person or entity with an adjustment in the Base Bid or Alternate Bid to cover the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

§ 6.3.4 Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 Bond Requirements

§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Bonds may be secured through the Bidder's usual sources.

§ 7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

§ 7.1.3 If the Owner requires that bonds be secured from other than the Bidder's usual sources, changes in cost will be adjusted as provided in the Contract Documents.

§ 7.2 Time of Delivery and Form of Bonds

§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract. If the Work is to be commenced prior thereto in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312™, Performance Bond and Payment Bond. Both bonds shall be written in the amount of the Contract Sum.

§ 7.2.3 The bonds shall be dated on or after the date of the Contract.

§ 7.2.4 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on AIA Document A101™, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum.

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

The Supplemental Instructions to Bidders: The Supplementary Instructions to Bidders contain changes and additions to the AIA Document A-701 Instructions to Bidders. Where any part of the AIA Instructions to Bidders is modified or voided by the Supplemental Instructions to Bidders, the unaltered provisions shall remain in effect.

1. ARTICLE 2 BIDDER'S REPRESENTATIONS

2.1.3. (Add the following): EXAMINATION. Contractors will not be given extra payments for conditions which can be determined by examining the site and documents.

Add the following Clauses 2.1.3.1 and 2.1.3.2 to Subparagraph 2.1.3:

2.1.3.1 The General Contractor will coordinate all Pre-Bid walk-throughs.

2. ARTICLE 3 BIDDING DOCUMENTS

3.1 COPIES

3.1.1 (Add the following): Contractors and Subcontractors and Material Suppliers may obtain Drawings and Project Manuals from the Architect upon deposit of $200.00 per set.

Contractors who submit Bids may obtain refund of deposits by returning sets in good condition no more than 10 days after the bid opening.

3.2.6 (Add the following): CONFLICTS IN CONTRACT DOCUMENTS. Contract Documents shall consist of the following component parts:

1. Advertisement for Bids.
2. Addendums.
3. The Accepted Proposal.
4. General Conditions of the Contract.
5. Supplementary General Conditions.
6. Specifications.
7. Plans and Drawings (Large Scale over Small Scale).
8. This Instrument

In the event that any provision in any of the component part of the Contract conflicts with any provision of any other component part, the provision in the component part first enumerated herein shall govern, except as otherwise specifically stated.

3. ARTICLE 4 BIDDING PROCEDURES

4.1.9 (Add the following): SUBMITTAL. Submit Bids and Bid Security in an opaque, sealed envelope. Identify the envelope with: (1) Project name, (2) name of Bidder, (3) type of Contractor, (4) Contractor's Montana Public License Number. Submit proposals in accordance with the Invitation To Bid.

4.2.4 (Add the following): BID SECURITY. Bid Security shall be made payable to the Owner, School District No.2, in the amount of 10 (ten) percent of the Bid Sum. Security shall be either certified check or Bid Bond issued by surety licensed to conduct business in the State of Montana. The successful Bidder's security will be retained until he has signed the Contract and furnished the required, 100 (one hundred) percent total construction cost, payment· and performance bonds. The Owner reserves the right to retain the security of the next 2(two) lowest Bidders until the lowest Bidder enters into Contract or until 60 (sixty) days after Bid Opening, whichever is the shorter. All other Bid security will be returned as soon as practicable. If any Bidder refuses to enter into a Contract, the Owner will retain his Bid Security as liquidated damages, but not as a penalty. The Bid Security is to be submitted with the Submission of Bid.

4.3.5 (Add the following): CONTRACTOR'S LICENSE. (MT) Bidders shall be holder of a proper Montana Public Contractor's Registration No. for this class of Work; (Title 15 Chapter 50 MCA 1982).

Subcontractors for Work greater than $5,000.00 shall hold a proper Montana Public Contractor's Registration No. prior to commencement of the Project.

4. ARTICLE 5 CONSIDERATION OF BIDS

5.3.3 (Add the following): AWARD. The Contract will be awarded on the basis of lowest responsible Bid.

5. ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

7.1.4 (Add the following): PERFORMANCE, LABOR AND MATERIAL PAYMENT BONDS. (MT) The Owner shall require the successful Contractor to furnish a Performance Bond in the amount of 100 percent of the Contract price as security for the faithful performance of this Contract. The Owner shall require the successful Contractor to furnish a Labor and Material Payment Bond in the amount of 100 percent of the Contract Price as security for the payment of all persons performing labor and furnishing materials in connection therewith.

The bonds shall be signed by the Attorney-in-fact and countersigned by a Montana Resident Agent.

Bond shall be secured from a State Licensed Bonding Company and approved by the Owner.

6. MONTANA CONTRACTOR'S TAX

All Contractors are reminded that one percent (1%) of the total Contract sum will be withheld from all payment due to Contractor's according to Law enacted by the 1967 Legislature.

7. GENERAL CONDITIONS

The "General Conditions" of the Contract; AIA Document A201-2007 shall be read by all figuring any part of the job and shall be held responsible for their content even though they are not repeated at the beginning of each division of these Specifications.

END OF SECTION

AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)

BOND AMOUNT:

PROJECT:
(Name, location or address, and Project number, if any)

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

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

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this day of

(Witness)	*(Contractor as Principal)* *(Seal)*
	(Title)
(Witness)	*(Surety)* *(Seal)*
	(Title)

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.

Init.

/

DRAFT

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.)

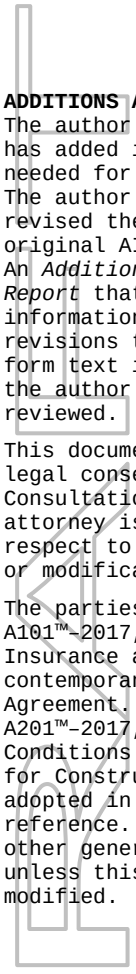
BETWEEN the Owner:
(Name, legal status, address and other information)

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

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

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

The Owner and Contractor agree as follows.



ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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

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

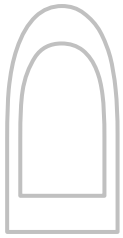


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TABLE OF ARTICLES

ARTICLE 1 THE CONTRACT DOCUMENTS

§ 1.1 The Contract Documents consist of this, including any exhibits, the Conditions of the Contract (General, or Other Conditions) and any amendments or riders thereto, Drawings, Specifications, Addenda issued prior to execution of this Agreement, Bid/Proposal documents, other documents listed in this Agreement, Modifications issued after execution of this Agreement, and Contractor's proof of payment and performance bonds and proof of insurance. These form the Contract, and are as fully a part of the Contract as if attached to thereto or repeated therein.

§ 1.2 The Contract Documents represent the entire and integrated agreement between the Owner and the Contractor and supersede all prior negotiations, representations, or agreements, either written or oral. The Contract Documents may be amended only by written Modification approved by the Owner's Board of Trustees, and signed by Owner's authorized representative and Contractor.

§ 1.3 The Contractor is an independent contractor of the Owner. The Contractor shall furnish his reasonable skill and judgment and cooperate with the Architect in furthering the best interests of the Owner to perform the Work defined in the Contract Documents, in accordance with the Owner's requirements and construction costs limitations, as approved by the Board and set forth in the Contract Documents. All Work shall be performed in conformity with the Contract Documents and must meet applicable national, state and local codes.

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.)

«Date of this agreement and issuance of the final building permit, whichever is latest »

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.

[« X »] By the following date: « August 30, 2020 »

§ 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 Work is not finally completed by the time stated herein, or as extended by the Owner's Board of Trustees, no payments for Work completed beyond that time shall be made until the Project reaches Final Completion.

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 «word amount»
($ «dollar amount »), subject to additions and deductions as provided in the Contract Documents.

§ 4.1.1 Except as permitted herein, The Owner shall in no event be obligated to the Contractor for more than the amount set forth in Section 4.1.

§ 4.2 Alternates

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

Item	Price
N/A	

§ 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.)

$250 per calendar day beyond the date of substantial completion.

§ 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:

Refer to the A201-2017 as amended.

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the «fifth» («5th») day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the «twenty-fifth» («25th») day of the «same» 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 «thirty» («30») 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.

§ 5.1.6.3 The Contractor's application for payment shall constitute a representation to the Owner, based on the Contractor's determination at the site, that, to the best of the Contractor's knowledge, information and belief, the Work has progressed to the point indicated and 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 minor deviations from the Contract Documents correctable prior to completion and to specific qualifications expressed by the Contractor in writing.

§ 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%, which shall be inclusive of any withholding required by 18-2-404, MCA.

§ 5.1.7.2 The retainage shall be released when the Project receives a certificate of occupancy and all Work has been accepted by the Owner and, if required, the federal, state, and/or local authority having jurisdiction.

§ 5.1.7.1.1 The following items are not subject to retainage:

(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

N/A

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:

(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

N/A

§ 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.)

N/A

§ 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.

§ 5.1.10 The Contractor agrees to and acknowledges the withholding and submission of the 1% Gross Receipts Tax as may be required under § 15-50-206, MCA. The Contractor agrees to withhold the 1% license fee from payments to subcontractors as may be required and inform the Department of Revenue on prescribed Department of Revenue forms of the amount of the 1% license fee in Contractor's account to be allocated and transferred to the subcontractor pursuant to MCA §15-50-206.

§ 5.1.11 In addition to the requirements set forth in Article 5 of the Standard Agreement, each Application for Payment shall also include a list, with backup data, of how each payment shall be spent, including a list detailing which subcontractors and suppliers will be paid out of funds paid by the Owner and the amount of such payments to subcontractors and suppliers, and in the next payment cycle, proof of each payment to Contractor's subcontractors and suppliers after payment.

§ 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:

N/A

§ 5.2.3 If Contractor fails or refuses to complete the Work, or has unsettled claims with Owner, then any Final Payment to Contractor shall be subject to deduction for such amounts as the Architect shall determine as the cost for completing incomplete Work and the value of unsettled claims.

§ 5.2.4 The amount of the final payment shall be subtracted by amounts Owner disputes, refuses or withholds payment.

§ 5.2.4 Time is of the essence in all phases of the Work. It is specifically understood and agreed by and between Owner and Contractor that time is of the essence in the Substantial Completion and Final Completion of the Project and Owner shall sustain actual damages as a result of Contractor's failure, neglect or refusal to achieve said deadlines. Failure to substantially complete the Work within the designated period, or as may be extended, shall be construed as a breach of this Agreement.

§ 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.)

«10» % «per annum»

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.)

N/A

§ 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

[«X»] Litigation in Fourth Judicial District Court, Missoula County, Montana

[« »] 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.)

Zero ($0) dollars.

§ 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)

TBD

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

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in the the Bid Documents attached hereto and 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. The Contractor shall furnish Owner, in a form satisfactory to the Owner, a full and duly executed Performance and Payment Bonds, underwritten by a surety or sureties satisfactory to the Owner, in the full amount of the contract sum pursuant to § 18-2-201, MCA.

§ 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:

§ 8.7.1 The Contractor shall not subcontract, transfer or assign any of the work to be performed by it under this Agreement without the express written consent of the Owner. The Contractor represents and warrants the following to the Owner, as an inducement to the Owner to execute this Contract, which representations and warranties shall survive the execution and delivery of the Contract and the Final Completion of the Work:

a. That it is financially solvent, able to pay its debts as they mature, and possessed of sufficient working capital to complete the work and perform its obligations hereunder;

b. That it familiar with the Plans and is able to furnish the tools, materials, supplies, equipment, qualified labor, and competent supervision required to timely complete the work and perform its obligations hereunder;

c. That it is authorized to do business in the State of Montana and properly licensed by all necessary governmental, public and quasi-public authorities having jurisdiction over it, the work, or the site of the work to be performed;

d. That it will perform all work in conformance with applicable plans, specifications and building codes;

e. That it will perform the work to the satisfaction of the Owner; and

f. That it shall execute all work in a diligent, efficient, lawful, competent, skillful, and most workmanlike manner commensurate with the applicable standards of the profession, and to devote such time as is necessary to perform the services required under this Agreement.

§ 8.7.2 All work, labor, services to be provided by the Contractor must comply with all other applicable federal, state, local laws, rules, regulations, statutes, ordinances and directives now in force or hereafter in effect. The Contractor shall also comply with all applicable safety laws, rules, regulations, statues, ordinances and directives. The Contractor shall not discriminate against any employee or applicant for employment because of race, religion, age, disability, sex, marital status, creed, or national origin. The Contractor agrees to indemnify and hold harmless the Owner from and against any and all claims, loss or expense caused directly or indirectly by its failure to fully comply herewith.

§ 8.7.3 The Contractor understands and agrees that the contract work shall be completed in strict compliance with the Contract Documents and that a deviation from those Documents constitutes default. It is expressly understood and agreed that no substitutions, rules, customs or usages, shortcuts or other alternate methods shall in any way be implied or inferred into this contract. It is further understood that it is the Contractor's responsibility to obtain and adhere to the Contract Documents.

§ 8.7.4 The Contractor shall not allow any liens to be filed against the Owner relating to the work to be performed under this Agreement. The Contractor shall indemnify and hold the Owner harmless from all liens, or claims of rights to enforce liens, against the Owner arising out of any work to be performed under this Agreement. Neither final payment by the Owner or acceptance of work performed shall constitute a waiver of this indemnity. If any lien or claim for lien shall at any time be filed, the Contractor shall refund to the Owner all monies the Owner may be compelled to pay in discharging the lien including all costs and its reasonable attorney fees.

§ 8.7.5 In the event either party files suit to enforce their rights under this Agreement the prevailing party shall be entitled to recover its costs and attorney's fees from the other party, in addition to any other damages awarded by the court. It is understood and agreed that any suit filed to interpret or enforce any of the provisions of this Agreement shall be filed in the Fourth Judicial District Court of the State of Montana.

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

Number	Title	Date

.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

[«X »] Supplementary and other Conditions of the Contract:

BIDDING DOCUMENTS

.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)*

AIA® Document A312™ – 2010

Performance Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

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

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

OWNER:
(Name, legal status and address)

CONSTRUCTION CONTRACT
Date:

Amount:

Description:
(Name and location)

BOND
Date:
(Not earlier than Construction Contract Date)

Amount:

Modifications to this Bond: ☐ None ☐ See Section 16

CONTRACTOR AS PRINCIPAL
Company: *(Corporate Seal)*

Signature: _____
Name and Title:

SURETY
Company: *(Corporate Seal)*

Signature: _____
Name and Title:

(Any additional signatures appear on the last page of this Performance Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)
AGENT or **BROKER:**

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

.1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

.2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

.3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

.2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and

.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 Balance of the Contract Price. The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 Contractor Default. Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		SURETY	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	
Address		Address	

AIA® Document A312™ – 2010

Payment Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

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

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

OWNER:
(Name, legal status and address)

CONSTRUCTION CONTRACT
Date:

Amount:

Description:
(Name and location)

BOND
Date:
(Not earlier than Construction Contract Date)

Amount:

Modifications to this Bond: ☐ None ☐ See Section 18

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	

(Any additional signatures appear on the last page of this Payment Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or **BROKER:**

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

.2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- .1 the name of the Claimant;
- .2 the name of the person for whom the labor was done, or materials or equipment furnished;
- .3 a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- .4 a brief description of the labor, materials or equipment furnished;
- .5 the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- .6 the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- .7 the total amount of previous payments received by the Claimant; and
- .8 the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

§ 16.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	
Address		Address	

Init.

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DRAFT

AIA® Document A201™ – 2017

General Conditions of the Contract for Construction

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

THE OWNER:
(Name, legal status and address)

THE ARCHITECT:
(Name, legal status and address)

TABLE OF ARTICLES

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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

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

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(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 consist of the AIA A201-2017 General Conditions of the Contract, the AIA A101-2017 (Standard Agreement), as amended and any exhibits, including but not limited to the Drawings, Specifications, Addenda issued prior to execution of this Agreement, Bid/Proposal documents, other documents listed in this Agreement, Modifications issued after execution of this Agreement, and Contractor's proof of payment and performance bonds and proof of insurance. 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. These form the Contract, and are as fully a part of the Contract as if attached to this Rider or the Standard Agreement or repeated therein.

§ 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. When amendment of the Contract Documents is necessary because of a modification to the total project budget (including alternates if any) or a change in the Date of Substantial Completion or Final Completion, written modification of the Contract Documents shall be approved only by the Owner's Board of Trustees and signed by Owner's authorized representative and Contractor. All other amendments of the Contract Documents shall be approved and signed by Owner's authorized representative and Contractor. 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, (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. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

§ 1.1.9 Precedence of Contract Documents

In the event of inconsistencies among the Contract Documents, the Contract Documents shall be given precedence in the following order:

.1 AIA A101-2017 (As Amended)

.2 Exhibits/Addenda
.3 AIA A201-2017 General Conditions of the Contract (As Amended)

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

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

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

§ 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.

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

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. 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 suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.5.3 The Owner is granted an irrevocable license to use the Shop Drawings, specifications and other documents prepared by the Contractor for this Project and for future work at the property which is the site of the Project, but not at any other location. Contractor shall not use or allow to be used the Shop Drawings, specifications and reports or the unique design aspects of this Project for any other project, without the prior written approval of Owner. Contractor may re-use standard specification texts and details.

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

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

§ 1.7 Discrepancies in Contract Documents

Should the Contractor find discrepancies, omissions or conflicts within the Contract Documents, or be in doubt as to their meaning, the Contractor shall notify in writing the Architect and Owner as soon as reasonably possible, and Architect will issue a written addendum to all parties that is consistent with the Owner's Scope of the Work.

§ 1.8 Cooperation

Representatives of the Owner, Contractor, and Architect shall meet periodically at mutually agreed upon intervals, for the purpose of establishing procedures to facilitate cooperation, communication, and timely responses among the participants. By participating in this agreement, the parties do not intend to create additional contractual obligations or modify the legal relationships which may otherwise exist.

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.

§ 2.1.2 The Board of Trustees, by majority vote, is the only representative of the Owner having the power to enter into a contract, to approve changes in the total project budget including any alternates, or to agree to an extension to the date of Substantial or Final Completion. The Board will act as soon as reasonably possible to avoid undue delays. The Board shall designate an authorized representative to act on its behalf for day-to-day operations under the Contract. Neither the Architect nor the Contractor may rely upon the direction of any employee of the Owner who has not been designed as the authorized representative. The Owner shall not be financially responsible for actions taken by the Architect or the Contractor in reliance upon direction from unauthorized persons.

§ 2.1.3 No mechanic, contractor, material person, artisan, or laborer, skilled or unskilled, shall ever in any manner have, claim, or acquire any lien upon the buildings or any of the improvements of whatsoever nature or kind so erected or to be erected by virtue of this Contract or upon any of the land on which said buildings or any of the improvements, are so erected, built, or situated. It shall be further understood that this Contract is not written for the benefit of third parties.

§ 2.2 Evidence of the Owner's Financial Arrangements

§ 2.2.1 Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

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

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

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 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 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.

§ 2.3.2 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.

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

§ 2.3.4 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. Historical surveys provided by the Owner shall be provided for information only and are not warranted or represented to show the conditions at the Project site accurately. The Contractor may use the information at its own risk and shall use customary precaution relating to the performance of the Work. The Contractor may reasonably rely on the accuracy of new surveys furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.5 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.

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

§ 2.3.7 The Owner has no duty to discover any design errors or omissions in the Drawings, Plans, Specifications and other Construction Documents, and has no duty to notify Contractor of same. By entering into the Contract Documents or any Agreement with any Architect, Owner does not warrant the adequacy and accuracy of any Drawings, Plans, Specifications or other Construction Documents, except to the extent that the Owner or Architect specifies a particular product. The Owner is not responsible to ascertain that the Contract Documents are in accordance with the applicable laws, statutes, ordinances, building codes, and rules and regulations. The Architect shall remain responsible for the adhering to the aforementioned items in the development of the Contract Documents, and Contractor shall remain responsible for execution of these items as outlined within the Contract Documents, which have been developed by the Architect.

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly 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.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of

correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

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 its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.1.4 It is understood and agreed that the relationship of Contractor to Owner shall be that of an independent contractor. Nothing contained in this Contract Documents or inferable from the Contract Documents shall be deemed or construed to: 1) make Contractor the agent, servant or employee of the Owner; or 2) 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.

§ 3.2 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.

§ 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 2.3.4, 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 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 Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the 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 submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.2.4.1 The Contractor represents and warrants by submissions of a bid that it has carefully examined the Construction Documents, any soil test reports, drainage studies, geotechnical or other reports, and the site of the Work and that, from its own investigations, it has satisfied itself as to the nature and location of the Work, the character, quality, and quantity of surface and subsurface materials likely to be encountered, the character of equipment and other facilities needed for the performance of the Work, the general and local conditions and all other materials which may in any way affect the Work or its performance. Without the Owner's prior written approval, the Contractor shall not be entitled to compensation for costs arising from the Contractor's failure to visit the site or the Contractor's failure to thoroughly study and compare all of the Construction Documents. The Contractor shall be entitled to compensation for concealed conditions which the Contractor could not have discovered through reasonable investigation prior to the commencement of the Work.

§ 3.2.5 Prior to performing any Work, and only if applicable, the Contractor shall retain a third-party locate company to locate utility lines, pipes, and cables and ensure the discovery of the location of all utility lines as shown and located on the plans and specifications. The Contractor shall perform any Work in such a manner so as to avoid damaging any such lines, cables, pipes, and pipelines. In addition, the Contractor shall independently determine the location of same. If the lines, pipes and cables were properly located, Contractor shall be responsible for any damage done to such utility lines, cables, pipes and pipelines during its Work, and shall be responsible for any loss, damage, or extra expense resulting from such damage. Repairs shall be made immediately to restore all service. Before performing any portion of the Work, the Contractor shall fully investigate all physical aspects of the Project Site and verify all dimensions, measurements, property lines, grades and elevations, existing improvements, and general suitability of existing conditions at the Project site.

§ 3.2.6 The Contractor shall not be entitled to any additional time or compensation for any additional work caused by the Contractor's fault, improper construction, or by Contractor's failure to carefully study and compare the Contract Documents prior to execution of the Work.

§ 3.2.7 If the Contractor has knowledge that any of the products or systems specified will perform in a manner that will limit the Contractor's ability to satisfactorily perform the Work or to honor its warranty, or will result in a limitation of or interference with the Owner's intended use, then the Contractor shall promptly notify the Architect and Owner in writing, providing substantiation for his position. Any necessary changes, including substitution of materials, shall be accomplished by appropriate Modification.

§ 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. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's 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 As part of the Contractor's responsibility for the acts and omissions of his employees, Subcontractors and their agents and employees, the Contractor shall enforce the Owner's alcohol-free, drug-free, tobacco-free (tobacco includes vapor products), discrimination-free, harassment-free and weapon-free policies and zones, which will require compliance with those policies and zones by the Contractor's employees, subcontractors, and all other persons carrying out the Contract. The Contractor shall require all construction workers, whether the Contractor's own forces or the forces of the Contractor's subcontractors, while on the Owner's property, to refrain from

committing any criminal conduct, using tobacco products (which shall be broadly interpreted to include all nicotine and vapor products consistent with District policy), possessing or drinking alcoholic beverages, possessing or using illegal drugs or any controlled substance, possessing/carrying weapons, speaking profane and/or offensive language, or engaging in any inappropriate interactions of any nature whatsoever with any District students or staff, including talking, touching, staring or otherwise contributing to a hostile or offensive environment for Owner's students and staff. The Contractor shall also require adequate and appropriate dress and identification of the Contractor's employees, subcontractors, and all other persons carrying out the Work. The Contractor shall further ensure that no on-site fraternization shall occur between personnel under the Contractor's and Subcontractor's direct or indirect supervision and Owner's students or employees and the general public. Failure of an individual to adhere to these standards of conduct shall result in the immediate ejection of the offending employee from all construction on any of the Owner's property. Repeated ejection of Contractor's or the Contractor's subcontractor's forces, or one serious infraction, can result in the immediate termination of the Contract Documents by the Owner.

The Contractor releases, indemnifies and holds harmless the Owner for the Contractor's forces' non-compliance with owner's drug-free, alcohol-free, weapon-free, discrimination-free, harassment-free, and tobacco-free zones, or Contractor's forces' noncompliance with immigration laws or regulations. Any individual found by Owner to have violated these restrictions is subject to permanent removal from the Project, at Owner's request. The Contractor shall place similar language in its subcontract agreements, requiring its Subcontractors to be responsible for their own forces and Contractor shall cooperate with the Owner to ensure Subcontractor compliance.

§ 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 approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the 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 Not later than 14 days from the Contract Date, the Contractor shall provide a list showing the name of the manufacturer proposed to be used for each of the products identified in the General Requirements of the Specifications (Division 1) and the name of the installing Subcontractor.

§ 3.4.5 The Architect will promptly reply in writing to the Contractor stating whether the Owner or the Architect, after due investigation, has reasonable objection to any such proposal. If adequate data on any proposed manufacturer or installer is not available, the Architect may state that action will be deferred until the Contractor provides further data. Failure of the Owner or Architect to reply promptly shall constitute notice of no reasonable objection. Failure to object to a manufacturer shall not constitute a waiver of any of the requirements of the Contract Documents, and all products furnished by the listed manufacturer must conform to such requirements.

§ 3.4.6 In any Contract let for state work, the Contractor shall pay the standard prevailing rate of wages, including fringe benefits for health and welfare and pension contributions and travel allowance provisions in effect and applicable to the county or locality in which the work is being performed (18-2-403, MCA).

§ 3.4.6.1 The State of Montana - Department of Labor and Industry has established the standard prevailing rate of wages and a copy of which, entitled Wage Rate Determination, is bound in the Project Specifications.

§ 3.4.6.2 The Contractor shall classify all workers in the Project in accordance with the Wage Rate Determination. In the event the Contractor is unable to classify a worker in accordance with these rates, he shall contact the State of Montana Employment Relations Division, Department of Labor and Industry, PO Box 1728, Helena, Montana 59624, or phone (406) 444-5600, for a determination of the prevailing wage rate to be paid that particular worker.

The Contractor shall be responsible for obtaining wage rates for all workers on the Project prior to their performing any work on the Project.

§ 3.4.7 The Contractor shall ensure that it and its Subcontractors and anyone else for whom it is responsible does not employ for any on-site portions of the Project any individual who is a registered sex offender or has been convicted of a crime against children or involving violence in any jurisdiction.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or 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, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. Generally all Work shall be warranted for a period of one year upon the acceptance of Work at substantial completion inspection. Deficiency items established by that inspection will only begin their warranty period after they have been corrected, reexamined, and approved. The date of the approval sets the first day of the warranty period.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 3.5.3 The Contractor shall take no action or fail to act in any way which results in the termination or expiration of such third party warranties or which otherwise results in prejudice to the rights of Owner under such warranties. The Contractor agrees to provide all notices required for the effectiveness of such warranties and shall include provisions in the contracts with the providers and manufacturers of such systems and equipment whereby Owner shall have a direct right, but not a duty, of enforcement of such warranty obligations.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor 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, the Contractor shall secure and pay for the building permit as well as for other 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.

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

§ 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 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum

or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.

§ 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 superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. The superintendent in attendance at the Project site during the progress of the work shall remain at the site and on the Project until Final Completion.

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

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

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably 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, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

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

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 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. The Contractor represents and warrants that all Shop Drawings shall be prepared by persons and entities possessing expertise and experience in the trade for which the shop drawings are prepared and, if required by the Architect or applicable law, by a licensed engineer.

§ 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 how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review 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 the requirements of the Contract Documents by the Architect's approval of

Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect of such deviation at the time of submittal and (1) the Architect has given written approval to 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 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.

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

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

§ 3.13 Use of Site

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

The Contractor shall ensure that the Work, at all times, is performed in a manner that affords Owner reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work shall be performed in such a manner that public areas adjacent to the Site of the Work shall be free from all debris, building material and equipment likely to cause hazardous conditions. Without limitations of any other provision of the Contract Documents, Contractor shall use its best efforts to minimize any interference with the occupancy or use of any area or building adjacent to the site of the Work, or the building, in the event of partial occupancy.

§ 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, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

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

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and 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 the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect with access to the Work in preparation and progress wherever located. The presence of the Owner, Architect or their representatives does not constitute acceptance or approval of the work.

§ 3.17 Royalties, Patents and Copyrights

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

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall 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), but only to the extent caused by the intentional, illegal, fraudulent or 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.

§ 3.18.3 The indemnity and hold harmless provisions in Section 3.18 of the Conditions and the above paragraphs shall survive the completion, termination or expiration of the Contract Documents.

ARTICLE 4 ARCHITECT

§ 4.1 General

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

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

§ 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 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, 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.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not 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

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 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. 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 13.4.2 and 13.4.3, whether or not the 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, 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 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 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 order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections 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 Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 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, 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 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 the subcontractors of a Separate Contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. 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, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-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 for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

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

§ 5.3.1 The Contractor shall promptly notify Owner and Architect of any material defaults by any Subcontractor. Notwithstanding any provision contained in Article 5 of the General Conditions to the contrary, it is hereby acknowledged and agreed that Owner has in no way agreed, expressly or implicitly, nor will Owner agree, to allow any Subcontractor or other material man or worker employed by Contractor the right to obtain a personal judgment or to create a mechanic's or material man's lien against Owner for the amount due from the Owner or the Contractor.

§ 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; 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 has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

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

§ 5.4.4 An assignment of the subcontract agreement by the Contractor to the Owner shall not constitute a waiver by Owner of its rights against Contractor, including, but not limited to, claims for defaults, delays or defects for which a subcontractor or material vendor may also be liable.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

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

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

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its 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 or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

§ 6.2 Mutual Responsibility

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

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 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, 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 that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

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

§ 6.3 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. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.2 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 Cost shall be limited to the following; cost of materials, including sales tax and cost of delivery, cost of labor, including social security, old age and unemployment insurance, and fringe benefits under collective bargaining agreements; workmen's compensation insurance, bond premiums; and rental value of power-tools and equipment. Overhead shall be included and shall include the following: supervision, superintendence, wages of time keepers, watchmen and clerks, hand tools, incidentals, general office expense, and all other expenses not included in "cost".

§ 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 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

- **.1** Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
- **.2** Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
- **.3** Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- **.4** Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and
- **.5** Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 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.

§ 7.3.7 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.

§ 7.3.8 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 may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

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, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

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

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

§ 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.

§ 8.3.4 Time Extension for Unusually Severe Weather

§ 8.3.4.1 This provision specifies the procedure for the determination of time extensions for unusually severe weather. The amount of time provided in the Contract to complete the work takes into consideration a certain number of anticipated adverse weather days. No weather related time extensions will be allowed unless the actual number of adverse weather days in a given month exceeds the anticipated number. The listing below defines the monthly anticipated adverse weather for the Contract period.

MONTHLY ANTICIPATED ADVERSE WEATHER CALENDAR DAYS

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
23	15	12	5	4	3	0	1	1	4	12	19

§ 8.3.4.2 The above schedule of anticipated adverse weather will constitute the baseline for monthly (or portion thereof) weather time evaluations. Upon acknowledgment of the notice to proceed and continuing throughout the Contract on a monthly basis, actual adverse weather days will be recorded on a calendar day basis (including weekends and holidays) and compared to the monthly anticipated adverse weather listed above. For purposes of this provision, the term actual adverse weather days shall include days impacted by actual adverse weather.

§ 8.3.4.3 The number of actual adverse weather days shall be calculated chronologically from the first to the last day in each month. Once the number of anticipated adverse weather days have been incurred, the Architect will examine any subsequently occurring adverse weather days to determine whether Contractor is entitled to a time extension. In order for a time extension to be considered, these subsequently occurring adverse weather days must prevent work for 50 percent or more of the Contractor's workday and delay work critical to the timely completion of the Project. The Architect will convert any delays meeting the above requirements to calendar days and issue a modification in accordance with the Contract provisions.

§ 8.3.4.4 An adverse weather day is defined as a day where one or more of the following conditions occur:

.1 Precipitation is equal to or greater than one tenth inch (0.10) per day. Low surface temperature for the day is equal to or less than 26 degrees F. Surface winds are equal to or greater than 39 miles per hour.

§ 8.4 The Architect will monitor construction activities and the Project Schedule to verify that the Contractor is fulfilling his time commitments. If the Contractor is not achieving the Project Schedule for any reason, other than as indicated in Paragraph 8.3, then the Contractor shall be required to provide any additional labor, material, equipment and/or extended work days and work weeks, at no additional cost to the Owner, to regain conformance with the Project Schedule. The Project Schedule shall be maintained.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

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

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent 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. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, 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 supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.1.3 Until the work is 100 percent complete, the Owner will pay 95 percent of the amount due to the Contractor on account of progress payments. Retainage will only be released upon final acceptance of each portion of the work for which a separate price is stated in the construction contract along with the Contractor submitting a completed Consent of Surety.

§ 9.3.2 Unless otherwise provided in the Contract Documents, the Owner shall make payments on account of the Contract based on the value of Work estimated by the Contractor in the schedule of values and as itemized in the submitted Application for Payment to have been completed on or about the last day of each calendar month and to be acceptable. Estimated quantities shall be considered only as approximate and shall be subject to the Architect's adjustment and correction. Payments will also be made on account of materials or equipment not incorporated in the Work, but delivered and suitably stored, protected and insured both at the site or at some other location agreed upon in writing (generally, unless otherwise approved, within 25 miles of the site and within the same State). Payments for materials or equipment stored either on or off the site shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to the Owner to establish the Owner's title to such materials or equipment or otherwise protect the Owner's interest, including applicable insurance and transportation for those 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, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

§ 9.3.4 The full Contract retainage may be reinstated if the manner of completion of the Work and its progress do not remain satisfactory to the Architect (or if the Surety withholds his consent), or for other good and sufficient reasons.

§ 9.3.5 Prior to the first application for payment, the Contractor shall submit the following information on the appropriate forms:

.1	Schedule of Amounts for Contract Payment: This form shall contain a breakdown of the labor, material, subcontractor, labor and material and other costs associated with the various portions of the work. See 9.2.1
.2	Subcontractors List: The prime Contractor shall list all sub-contractors doing work in excess of $5,000 and their current license number, address and amount of their Contract.
.3	Progress Schedule: The Contractor shall prepare a critical path schedule acceptable to the Architect/Engineer which shall show the estimated progress of the entire project through the time periods allowed for completion.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 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 suppliers for labor, materials or equipment;
- **.4** reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- **.5** damage to the Owner or a Separate Contractor;
- **.6** reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- **.7** repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

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

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

§ 9.6 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 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 and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

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

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

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

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted. Nothing herein shall be construed to permit or allow any liens to the Owner's Property.

§ 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' 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 shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

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

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the 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 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 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. 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 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, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.2.1 The following items must be completed and received by the Owner before Final Payment will be provided:

.1 Written certifications required below regarding asbestos, lead, and hazardous materials;
.2 Final list of Subcontractors;
.3 Contractor's warranties;
.4 Maintenance and instruction manuals; and
.5 Record drawings and "as built" drawings, in electronic form.

§ 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, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

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

.1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
.2 failure of the Work to comply with the requirements of the Contract Documents;
.3 terms of special warranties required by the Contract Documents;
.4 audits performed by the Owner, if permitted by the Contract Documents, after final payment; or
.5 Contractor's negligence or intentional acts or omissions.

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

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, a Subcontractor, or a Sub-subcontractor; and

.3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

§ 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 implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

§ 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. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

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

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

§ 10.2.8 Injury or Damage to Person or Property

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

§ 10.3 Hazardous Materials and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a 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 notify the Owner and Architect of the condition.

§ 10.3.1.1 Asbestos Free Facility

It is the Owner's and the Architect's intent to design, specify and approve only asbestos free materials and products for this Project. Any Contractor, Subcontractor, Material Supplier or Manufacturer intending to supply products or services for this Project shall notify the Architect in writing, within thirty (30) days after the

Notice to Proceed has been issued, or within ten (10) days of discovery, if he is aware of, or becomes aware of, any Asbestos Containing Materials or Products intended for installation in this Project.

When possible, a proposed Asbestos-Free substitute for any Asbestos containing Material shall also be submitted with the required written notification.

§ 10.3.2 Upon receipt of the Contractor's 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 the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. 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 by the amount of the Contractor's reasonable additional costs of shutdown, 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, 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 hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

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

§ 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 reimburse the Contractor for all cost and expense thereby incurred.

§ 10.4 Emergencies

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

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall deliver the required bonds to the Owner within (5) five days of the signing the Contract Documents, or if the Work is to be commenced prior thereto in response to a letter of intent, the Contractor shall, prior to the commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished.

§ 11.1.3 The Contractor shall deliver the required bonds to the Owner within (5) five days of the signing the Contract Documents, or if the Work is to be commenced prior thereto in response to a letter of intent, the Contractor shall, prior to the commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished.

§ 11.1.3.1 The Contractor shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner's liability insurance shall be excess and contributory.

§ 11.3 No Waiver of Subrogation

Notwithstanding any provisions in the Contract Documents to the contrary, the Owner does not waive its rights of subrogation relating to separate insurance policies purchased and maintained by Owner relating to property, real or personal or both, at or adjacent to the Project site.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

§11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15.

Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

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, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the 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 any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

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

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

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

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

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

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. 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.

§ 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, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

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

§ 13.3 Rights and Remedies

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

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

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made 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 tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

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

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

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

§ 13.5 Interest

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

§ 13.7 Discrimination

§ 13.7.1 The Contractor and the Contractor's Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, age, disability, sex, marital status, creed, or national origin.

§ 13.7.2 The Contractor and the Contractor's Subcontractors shall, in all solicitations or advertisements for employees placed by them or on their behalf, state that all qualified applications will receive consideration for employment without regard to race, religion, age, disability, sex, marital status, creed, or national origin.

§ 13.7.3 The Contractor and the Contractor's Subcontractors shall give preference to the employment of bona fide Montana residents in the performance of the Work in accordance with MCA § 18-2-403.

§ 13.8 Record Retention

§ 13.8.1 The Contractor shall at all times through the date of Final Completion, maintain job records, including, but not limited to, invoices, payment records, payroll record, daily reports, diaries, logs, instructions, drawings, receipts, subcontracts, purchase orders, vouchers, memoranda, other financial data and job meeting minutes applicable to the Project, in a manner which maintains the integrity of the documents. Job Records must be retained by Contractor for ten (10) years after the date of Final Completion of the Project. Contractor shall also maintain the following: subcontract files, including proposals of successful and unsuccessful bidders, bid recaps and subcontractor payments; original estimates; estimating work sheets; general ledger entries detail cash and trade discounts received; insurance rebates and dividends; and any other supporting evidence deemed necessary by the Owner to substantiate charges related to the Contract. The Contractor may retain any records referred to in this paragraph in electronic format, hard format, or any combination thereof in its sole discretion.

§ 13.8.2 The Contractor shall keep a full and detailed financial accounting system and shall exercise such controls as may be necessary for proper financial management under this Contract.

§ 13.8.3 In the event that the Owner discovers any errors/overpayments by the Owner, then the Contractor shall refund to the Owner the full amount of such overpayment within thirty (30) days of such discovery, or the Owner, at its option, reserves the right to deduct such amounts owed to the Owner from any payments due to the Contractor.

§ 13.9 Confidentiality

Neither the Architect nor the Contractor shall disclose any confidential information which comes into the possession of the Architect or the Contractor at any time during the Project, including but not limited to, the location and deployment of security devices, security access codes, student likenesses, student record information or employee information.

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, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

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

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

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

.4 The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

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

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, 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 or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- **.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 reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor 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 under 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 notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- **.1** cease operations as directed by the Owner in the notice;
- **.2** take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- **.3** except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.

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, a change in the Contract Time, 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. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

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

§ 15.1.2.1 Notwithstanding any provisions in the Contract Documents to the contrary, statutory limitation periods shall not accrue until the facts constituting the claim have been discovered or, in the exercise of due diligence, should have been discovered by the injured party if the facts constituting the claim are by their nature concealed or self-concealing; or before, during, or after the act causing the injury, a party has taken action which prevents the injured party from discovering the injury or its cause.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 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.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 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.

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

§ 15.1.7 Waiver of Claims for Consequential Damages

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

.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 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

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

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

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

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

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

§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation.

§ 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.

§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, 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 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

§ 15.3.4 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.

§ 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 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 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

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

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

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)*

SUPPLEMENTARY GENERAL CONDITIONS

The following supplements, modifies, changes, deletes from or adds to the "General Conditions of the Contract for Construction," AIA Document A201, 2007 Edition. Where a portion of the General Conditions is modified or deleted by these Supplementary General Conditions, the unaltered portions of the General Conditions shall remain in effect.

A. ARTICLE 3; CONTRACTOR

3.4 LABOR AND MATERIALS

Add the following Subparagraphs 3.4.4 and 3.4.5 to Paragraph 3.4:

3.4.4 Not later than 14 days from the Contract Date, the Contractor shall provide a list showing the name of the manufacturer proposed to be used for each of the products identified in the General Requirements of the Specifications (Division 01) and the name of the installing Subcontractor.

3.4.5 The Architect will promptly reply in writing to the Contractor stating whether the Owner or the Architect, after due investigation, has reasonable objection to any such proposal. If adequate data on any proposed manufacturer or installer is not available, the Architect may state that action will be deferred until the Contractor provides fut1her data. Failure of the Owner or Architect to reply promptly shall constitute notice of no reasonable objection. Failure to object to a manufacturer shall not constitute a waiver of any of the requirements of the Contract Documents, and all products furnished by the listed manufacturer must conform to such requirements.

3.4.6 In any Contract let for state work, the Contractor shall pay the standard prevailing rate of wages, including fringe benefits for health and welfare and pension contributions and travel allowance provisions in effect and applicable to the county or locality in which the work is being performed (18-2-403 , MCA).

Add the following Clauses to Subparagraph 3.4.6:

3.4.6.1 The State of Montana - Department of Labor and Industry has established the standard prevailing rate of wages and a copy of which, entitled Wage Rate Determination, is bound herein.

3.4.6.2 The Contractor shall classify all workers in the Project in accordance with the Wage Rate Determination. In the event the Contractor is unable to classify a worker in accordance with these rates, he shall contact the State of Montana Employment Relations Division, Department of Labor and Industry, PO Box 1728, Helena, Montana 59624, or phone (406) 444-5600, for a determination of the prevailing wage rate to be paid that particular worker. The Contractor shall be responsible for obtaining wage rates for all workers on the Project prior to their performing any work on the Project.

3.5 WARRANTY

Add the following to Subparagraph 3.5.1:

Generally all Work shall be warranted for a period of one year upon the acceptance of Work at substantial completion inspection. Deficiency items established by that inspection will only begin their warranty period after they have been corrected, reexamined, and approved. The date of the approval sets the first day of the warranty period.

3.6 TAXES

Add the following Subparagraph 3.6.2 to Paragraph 3.6:

3.6.2 All payments made to the Contractor or to the subcontractor pursuant to the provisions of this Agreement shall be subject to withholding as provided by law including, but not limited to, withholding as provided by Section 15-50-205 M.C.A. and Section 15-50-206 M.C.A.

3.7 PERMITS, FEES, NOTICES, AND COMPLIANCE WITH LAWS

Delete Paragraph 3.7.1 in its entirety and add the following new Paragraph 3.7.1:

3.7.1 The Contractor will be responsible for securing and paying for all required permits for the project (Building Permit, Mechanical Permit, Electrical Permit, Plumbing Permit, etc.) The Owner has submitted the plans to Missoula Development Services for permitting and has paid the 20% permit review fee. All other permits and fees (including any impact fees) are to be paid for by the Contractor.

3.9 SUPERINTENDENT

Add the following Clause 3.9.l.1 to Subparagraph 3.9.1:

3.9.1.1 The superintendent in attendance at the Project site during the progress of the work shall remain at the site and on the Project until Final Completion.

B. ARTICLE 7: CHANGES IN THE WORK

7.2 CHANGE ORDERS

Add the following Subparagraphs 7.2.2, 7.2.3 and 7.2.4 to Paragraph 7.2:

7.2.2 Cost shall be limited to the following: cost of materials, including sales tax and cost of delivery, cost of labor, including social security, old age and unemployment insurance, and fringe benefits under collective bargaining agreements; workmen's compensation insurance, bond premiums; and rental value of power tools and equipment. Overhead shall be included and shall include the following: supervision, superintendence, wages of time keepers, watchmen and clerks, hand tools, incidentals, general office expense, and all other expenses not included in "cost."

7.2.3 The Change Order form that will be used under this Contract will be AIA Document G701. Costs for Change Orders shall be determined in 7.3.3.3 as modified below.

7.2.4 Definitions of direct vs. indirect costs, allowable overhead and profit mark-ups and their use in figuring Change Order costs are as listed in 7.3.3.3 as modified below.

7.3 CONSTRUCTION CHANGE DIRECTIVES

Add the following Clause 7.3.3.5 to Subparagraph 7.3 .3:

7.3.3.5 "Cost" of the Contractor's Work shall be as follows:

(1) Cost Defined:

a. Direct costs are defined as the net cost to the Contractor resulting from the accomplishment of a given change. These include cost of materials including sales tax and tax for delivery; cost of direct labor including FICA and Employment security Contribution and Workmen's Compensation Insurance payments; cost of rental of tools and power equipment. Bond costs are considered part of direct costs. Direct costs do not include such items as superintendent time, foreman time, project manager time, project engineer time, secretarial time, field expenses, home office expenses, or overhead and related expenses. The above noted costs are considered to be indirect costs as noted below. This list is not intended to be all inclusive but representative of the types of items that are not to be considered direct expense.

b. Indirect costs are defined as general operational charges which cannot be determined from the accomplishment of a given change. These costs are considered pm1 of combined overhead and profit. Indirect costs include such items as superintendent time, foreman time, project manager time, project engineer time, secretarial time, field office expenses, home office expenses or overhead and related expenses. This list is not intended to be all inclusive but representative of the type of items that are to be considered indirect costs.

(2) Overhead and Profit:
Reasonable allowance for overhead and profit shall be defined as: Fifteen percent (15%) of the Contractor's direct costs on a change order; ten percent (10%) of the Contractor's cost for any amount due to a subcontractor for a change order; and fifteen percent (15%) of the subcontractor's direct costs on a change order for work he performs.

A Subcontractor's overhead and profit is not considered part of the direct costs of the work, and the General Contractor's mark-up shall not apply to that amount.

(3) When changes are deductive, overhead and profit shall be five percent (5%) of the direct costs of the Contractor's deleted own work and five percent (5%) of the direct costs of the subcontractor's deleted own work.

C. ARTICLE 8: TIME

8.2 PROGRESS AND COMPLETION

Add the following Subparagraph 8.2.4 to Paragraph 8.2:

8.2.4 The Owner will suffer financial loss if the Project is not Substantially Completed on the date set forth in the Contract Documents. The Contractor (and the Contractor's Surety) shall be liable for

and shall pay to the Owner the sums hereinafter stipulated as fixed, agreed and liquidated damages for each calendar day of delay until the Work is Substantially Completed: The sum will be assessed in the amount of Five Hundred Dollars ($500.00) per calendar day for each calendar day that the Work contemplated hereunder remains uncompleted and unaccepted beyond the time allowed in the Contract. The specified liquidated damages shall accrue in the amount and at the daily rate specified above.

8.3 DELAYS AND EXTENSION OF TIME

Add the following Subparagraph 8.3.4 to Paragraph 8.3:

8.3.4 Time extension for unusually severe weather.

Add the following Clauses 8.3.4.1 , 8.3.4.2, 8.3.4.3, and 8.3.4.4 to Subparagraph 8.3.4:

8.3.4.1 This provision specifies the procedure for the determination of time extensions for unusually severe weather. The amount of time provided in the Contract to complete the work takes into consideration a certain number of anticipated adverse weather days. o weather related time extensions will be allowed unless the actual number of adverse weather days in a given month exceeds the anticipated number. The listing below defines the monthly anticipated adverse weather for the Contract period.

MONTHLY ANTICIPATED ADVERSE WEATHER CALENDAR DAYS

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
23	15	12	5	4	3	0	1	1	4	12	19

8.3.4.2 The above schedule of anticipated adverse weather will constitute the baseline for monthly (or portion thereof) weather time evaluations. Upon acknowledgment of the notice to proceed and continuing throughout the Contract on a monthly basis, actual adverse weather days will be recorded on a calendar day basis (including weekends and holidays) and compared to the monthly anticipated adverse weather listed above. For purposes of this provision, the term actual adverse weather days shall include days impacted by actual adverse weather.

8.3.4.3 The number of actual adverse weather days shall be calculated chronologically from the first to the last day in each month. Once the number of anticipated adverse weather days have been incurred, the Architect will examine any subsequently occurring adverse weather days to determine whether Contractor is entitled to a time extension. In order for a time extension to be considered, these subsequently occurring adverse weather days must prevent work for 50 percent or more of the Contractor's workday and delay work critical to the timely completion of the Project. The Architect will convert any delays meeting the above requirements to calendar days and issue a modification in accordance with the Contract provisions.

8.3.4.4 An adverse weather day is defined as a day where one or more of the following conditions occur:

.1 Precipitation is equal to or greater than one tenth inch (0.10) per day. Low surface temperature for the day is equal to or less than 26 degrees F. Surface winds are equal to or greater than 39 miles per hour.

Add the following new Paragraph 8.4:

8.4 Substantial Completion Time

Contractor agrees to be Substantially complete with Phase I work by august 30, 2020.

8.4.1 The Architect will monitor construction activities and the Project Schedule to verify that the Contractor is fulfilling his time commitments. If the Contractor is not achieving the Project Schedule for any reason, other than as indicated in Paragraph 8.3, then the Contractor shall be required to provide any additional labor, material, equipment and/or extended work days and work weeks, at no additional cost to the Owner, to regain conformance with the Project Schedule. The Project Schedule shall be maintained.

D. ARTICLE 9; PAYMENTS AND COMPLETION

9.3 APPLICATIONS FOR PAYMENT

9.3.1 Delete in its entirety and substitute the following:

At least by the 25th day of the month, the Contractor shall submit to the Architect an itemized Application of 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 copied of requisitions for Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

Add the following Clauses 9.3.1.3, 9.3.1.4, and 9.3.1.5 to Subparagraph 9.3.1:

9.3.1.3 Until the work is one hundred percent (100%) complete, the Owner will pay ninety-five percent (95%) of the amount due to the Contractor on account of progress payments. Retainage will only be released upon final acceptance of each portion of the work for which a separate price is stated in the construction contract along with the Contractor submitting a completed Consent of Surety.

9.3.1.4 The one percent (1 %) Montana State Contractor's Tax (License Fee) will be withheld by the Owner. This is required by State Statute Title 15 Chapter 50 M.C.A.

9.3.1.5 Each pay application is to be accompanied by an updated Project (CPM) Schedule, certified payroll and lien waivers from each contractor, subcontractor and supplier billing in that cycle.

Modify Subparagraph 9.3.2, as follows:

9.3.2 Delete in its entirety and substitute the following:

Unless otherwise provided in the Contract Documents, the Owner shall make payments on account of the Contract based on the value of Work estimated by the Contractor in the schedule of values, and as itemized in the submitted Application for Payment, to have been completed on or about the last day of each calendar month and to be acceptable. Estimated quantities shall be considered only as approximate and shall be subject to the Architect's adjustment and correction. Payments will also be made on account of materials or equipment not incorporated in the Work, but delivered and suitably stored, protected and insured both at the site or at some other location agreed upon in writing (generally, unless otherwise approved, within 25 miles of the site and within the same State). Payments for materials or equipment stored either on or off the site shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to the Owner to establish the Owner's title to such materials or equipment or otherwise protect the Owner's interest, including applicable insurance and transportation for those materials and equipment stored off the site.

Add the following Clauses 9.3.4 and 9.3 .5 to Subparagraph 9.3:

9.3.4 The full Contract retainage may be reinstated if the manner of completion of the Work and its progress do not remain satisfactory to the Architect (or if the Surety withholds his consent), or for other good and sufficient reasons.

9.3.5 Prior to the first application for payment, the Contractor shall submit the following information on the appropriate forms:

.1 Schedule of Amounts for Contract Payment: This form shall contain a breakdown of the labor, material, subcontractor, labor and material and other costs associated with the various portions of the work. See Paragraph 9.2.

.2 Subcontractors List: The prime Contractor shall list all sub-contractors doing work in excess of $5,000 and their current license number, address and amount of their Contract.

.3 Progress Schedule: The Contractor shall prepare a critical path schedule acceptable to the Architect/Engineer which shall show the estimated progress of the entire project through the time periods allowed for completion.

9.10 FINAL COMPLETION AND FINAL PAYMENT

Add the following Subparagraph 9.10.6 to Paragraph 9.10:

9.10.6 The final pay application will be accompanied by the operation and maintenance manuals, product warranties and as-built record drawings.

E. ARTICLE 10: PROTECTION OF PERSONS AND PROPERTY

10.3 HAZARDOUS MATERIALS

Add the following Clause 10.3 .1.1 to Subparagraph 10.3.1:

1 0.3.1.1 Asbestos Free Facility. It is the Owner's and the Architect's intent to design, specify and approve only asbestos free materials and products for this Project. Any

Contractor, Subcontractor, Material Supplier or Manufacturer intending to supply products or services for this Project shall notify the Architect in writing, within thirty (30) days after the Notice to Proceed has been issued, or within ten (10) days of discovery, if he is aware of, or becomes aware of, any Asbestos Containing Materials or Products intended for installation in this Project. When possible, a proposed Asbestos-Free substitute for any Asbestos containing Material shall also be submitted with the required written notification.

F. ARTICLE 11: INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

Clarification items of Subparagraphs 11.1.2 and 11.1.3 :

Without limiting any of the other obligations or liabilities of the Contractor, Contractor shall secure and maintain such insurance from an insurance company (or companies) authorized to write insurance in the State where the work is located with minimum "A.M. Best Rating" of A, X, as will protect himself, his subcontractors, the Owner and the Architect and their respective agents and employees from claims for bodily injury, death or property damage which may arise from operations and completed operations under this Contract. Such coverage shall be written for claims arising out of all premises/operations, subcontracted operations, products/completed operations, and all liability assumed by the Contractor under any Contract or agreement. Contractor shall not commence work under this Contract until such insurance has been obtained and certificates of insurance, with binders, or certified copies of the insurance policy shall have been filed with the Owner and the Architect. The Owner and Architect will be named as additional insureds on Contractor's insurance. Owner and Architect's insurance will be excess and non-contributory with insurance claimed by the Contractor. The Contractor's insurance will be primary.

In addition, the Contractor shall obtain and pay the entire premium for Owners and Contractors protective Liability (OCP) policy to protect the Owner and Architect for their liability arising under this Contract.

Each insurance policy shall contain a clause providing that it will not be cancelled by the Insurance Company without forty-five (45) days written notice to the Owner and Architect of intention to cancel.

Add the following Clauses 11.1.1.9, 11.1.1.10, 11.1.1.11, and 11.1.1.12 to Subparagraph 11.1.1:

.9 Liability Insurance shall include all major divisions of coverage and be on a comprehensive basis including:

1. Premises Operations including X, C and U.
2. Independent Contractors' Protective.
3. Products and Completed Operations.
4. Personal Injury Liability.
5. Contractual - including specified provision for Contractor's obligation under Paragraph 3.1 8.
6. Owned, non-owned and hired motor vehicles.
7. Broad Form Property Damage including Completed Operations.
8. (Other coverages, if any)

.10 If the General Liability coverages are provided by a Commercial General Liability Policy on a claims-made basis, the policy date or Retroactive Date shall predate the Contract; the termination date of the policy or applicable extended reporting period shall be no earlier than the termination date of coverages required to be maintained after final payment, certified in accordance with Subparagraph 9.10.2.

. 11 Per Project Aggregate Endorsement required.

. 12 Waiver of subrogation in favor of Owner and Architect/Engineer.

Add the following Clause 11.1.2 .1 to Subparagraph 11 .1.2:

11.1.2.1 Insurance and Bonds:

Carrier Rating: A.M. Best Rating A- VI or Better

Contractors Liability- Limits of Liability Commercial

General Liability Policy:

A. $1 ,000,000 per Occurrence
   $2,000,000 Products & Completed Operations Aggregate
   $2,000,000 General Aggregate
B. Per Project Aggregate Endorsement
C. Blanket Waiver of Subrogation
D. Delete the 50 foot limitation of a Railroad on the Contractual Liability Section
E. Property Damage will include coverage for XCU
F. Additional Insured Endorsement- Will name **Missoula County Public Schools** as a **Primary Additional Insured including Completed Operations** Coverage. The use of ISO CG 3287& CG 3290 or its equivalent is acceptable. If the Additional Insured Endorsement does not accompany the certificate of insurance, the form numbers and edition date for the Additional Insured endorsement must be placed on the certificate.
G. Additional Insured Endorsement- Will name Architect & Engineers as an Additional Insured

Automobile Liability Policy:

A. Owned/Hired/Non-Owned Autos: $1,000,000 per Accident

Workers Compensation Policy:

A. Statutory Workers Compensation:
B. Employers Liability- Minimum Total Limits
   $1,000,000 Each Accident
   $1,000,000 Disease- Policy Limit
   $1,000,000 Disease- Each Employee
C. Copy of Contractors Exemption if applicable to be also submitted.

Umbrella/Excess Liability Policy:

A. $1,000,000 per Occurrence/$1,000,000 Aggregate
B. Billings Public Schools will also be an Additional Insured as follow form from Commercial General Liability Policy

Owners & Contractors Protective Liability Policy:

A. $1,500,000 each Occurrence
   $3,000,000 Aggregate
B. Contractor to obtain and pay for the entire premium for this policy and will be issued in the name of the Billings Public Schools.
C. Architect & Engineer to be named as an Additional Insured on this policy
D. Professional Services Contract- no OCP required

Contractors Tools/Equipment:

A. All tools/equipment leased, borrowed or owned by the Contractor will be their responsibility for insurance coverage

Cancellation/Non-Renewal Notice:

A. Policies will be endorsed to provide 30 days notice of cancellation or non-renewed by the carrier to Missoula County Public Schools and the Contractor

Optional Coverage's if required by Contract:

A. Professional Liability:
   1.) Design Build Liability [ ]
   2.) Architects/Engineers Professional Liability [ ]
   3.) Limits- _____

B. Contractors Pollution Liability:
   l.) Mold Abatement [ ]
   2.) Lead Paint Abatement [ ]
   3.) Asbestos Abatement [ ]
   4.) Limits: $1,000,000 per Claim/$2,000,000 Aggregate
   5.) **Name Missoula County Public Schools as an Additional Insured- including Completed Operations**
   6.) The General Contractor needs to discuss their Environmental/Pollution exposure for this project with their insurance professional.

C. The following Pollution Liability Insurance shall be changed to read as listed in the Supplemental General Conditions, Section 11.1.2.1

   Pollution Liability Insurance:

   Any Subcontractor doing abatement work, i.e. asbestos, lead or mold exposures must can)' an Environmental/Pollution Liability Policy per the following:

Limits:	$1,000,000	Per Claim
	$2,000,000	Aggregate

   The Subcontractor that is carrying the Environmental/Pollution Liability Policy will name MCPS, District #1 as an Additional Insured-including Completed Operations Liability with a certificate of insurance provided to the School District.

The General Contractor needs to discuss their Environmental/Pollution exposure with their insurance professional for this project.

Add the following sentence to Subparagraph 11.1.3:

Provide proof of insurance on ACORD Certificate of Insurance Form 25-S.

Add the following Clause 11.1.3.1 to Subparagraph 11.1.3:

11.1.3.1 The Contractor shall furnish one copy of each of the Certificate of Insurance herein required and one executed copy each of AIA Document G715 - Supplemental Attachment (copy enclosed) for each copy of the Agreement which shall specifically set forth evidence of all coverage required by Subparagraphs 11.1.1, 11.1.2 and 11.1.3. The form of the Certificate shall be as noted above. The Contractor shall furnish to the Owner copies of any endorsements that are subsequently issued amending coverage or limits.

Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate both, shall be furnished by Contractor to Owner! Architect.

11 .2 OWNER'S LIABILITY INSURANCE

Amend Subparagraph 11.2.1 and add the following:

The Contractor shall purchase and maintain insurance covering the Owner's contingent liability for claims, which may arise from operations under the Contract by Purchasing an Owner's and Contractor Protective Policy (OCP) or a Project Management Protective Policy.

11.3 PROPERTY INSURANCE

Add the following after the first sentence of Subparagraph 11.3.1:

The District shall carry the Builder's Risk insurance, not the contractor.

Delete Clause 11.3.1.2.

Delete Clause 11.3.1.3.

Amend Subparagraph 11.3.2. Substitute "Contractor" for the first reference to "Owner" in the first sentence.

Delete Subparagraph 11.3.4.

Delete Subparagraph 11.3.6 and substitute the following:

11.3.6 **Cancellation Notice:** Before an exposure to loss may occur, the Contractor shall file with the Owner two certified copies of the policy or policies providing this Property Insurance coverage, each containing those endorsements specifically related to the Project. Each policy shall contain

a provision that the policy will not be cancelled or allowed to expire until at least forty-five (45) days prior written notice has been given to the Contractor.

Modify Subparagraph 11.3.7 by substituting "Contractor" for "Owner" at the end of the first sentence.

Modify Subparagraph 11.3 .8 by substituting "Contractor" for "Owner" as fiduciary; except that at the first reference to "Owner" in the first sentence the word "this" should be substituted for "Owner's."

Modify Subparagraph 11.3 .9 by substituting "Contractor" for "Owner" each time the latter word appears.

Modify Subparagraph 11 .3.10 by substituting "Contractor" for "Owner" each time the latter word appears.

11.4 PERFORMANCE BOND AND PAYMENT BOND

Delete Subparagraph 11.4.1 and substitute the following Subparagraph 11.4.1:

11.4.1 The Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder. Bonds may be obtained through the Contractor's usual source and the cost thereof shall be included in the Contract Sum. The amount of each bond shall be equal to one hundred percent (100%) of the Contract Sum.

Add the following Clauses 11.4.1.1 and 11.4.1.2 to Subparagraph 11.4.1:

11.4.1.1 The Contractor shall deliver the required bonds to the Owner not later than three days following the date the Agreement is entered into, or if the Work is to be commenced prior thereto in response to a letter of intent, the Contractor shall, prior to the conU11encement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished

11.4.1.2 The Contractor shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

G. ARTICLE 16: EQUAL OPPORTUNITY

Add the following new ARTICLE 16:

16.1 The Contractor shall maintain policies of employment as follows:

16.1.1 The Contractor and all Subcontractors shall not discriminate against any employees or applicant for employment because of race, religion, color, sex, national origin or age. The Contractor shall take affirmative action to insure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex, national origin or age. Such action shall include, but not be limited to the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the policies of non-discrimination.

16.1.2 The Contractor and all Subcontractors shall, in all solicitations or advertisements for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex, national origin or age.

H. ARTICLE 17: MISCELLANEOUS SUPPLEMENTARY CONDITIONS

Add the following new ARTICLE 17:

17.1 CONTRACTORS BOND FOR WAGES AND FRINGE BENEFITS

17.1.1 Furnish and pay for bond insuring the payment of wages and fringe benefits as required by IS-2-20 I M.C.A. Failure or neglecting to deliver said bond, as specified, shall be considered as having abandoned the Contract and the Bid Security will be retained as liquidated damages.

17.2 CONTRACTOR PREFERENCE

17.2.1 In accordance with Section IS-I-102 M.C.A., the Owner shall award the contract to the lowest responsible bidder without regard to residency. However, a resident bidder will be allowed a preference on the contract against the bid of a non-resident bidder from any state or country that enforces a preference for resident bidders. The preference given to resident bidders of this state must be equal to the preference given in the other state or country.

17.3 RESIDENTS PREFERENCE

17.3.1 Contractor shall ensure that at least fifty percent (50%) of the contractor's workers performing labor on the project are bona fide Montana residents, as defined in l S-2-40 1 M.C.A.

17.4 ASSIGNMENTS

17.4.1 The Contractor shall not assign the whole or any part of this Contract or any monies due or to become due, hereunder, without written consent of the Owner. In case the Contractor assigns all or any part of any monies due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any monies due or to become due to the Contractor shall be subject to prior claims of all persons, firms, and corporations for services rendered or materials supplied for the performance of the Work called for in this Contract.

17.4.2 The Contractor and all Subcontractors hereby assign to the State of Montana any and all claims or causes of action for any antitrust law violations or damages arising therefrom as to goods, materials and services purchased under the terms of this agreement, and any change order that may result from this agreement. This assignment is made on behalf of the Contractor and all Subcontractors which may be hired or contracted with by the Contractor to furnish goods, materials or services required under the terms of this agreement.

END OF SECTION

MONTANA
PREVAILING WAGE RATES FOR BUILDING CONSTRUCTION SERVICES 2020

Effective: January 2, 2020

Steve Bullock, Governor
State of Montana

Galen Hollenbaugh, Commissioner
Department of Labor and Industry

To obtain copies of prevailing wage rate schedules, or for information relating to public works projects and payment of prevailing wage rates, visit ERD at www.mtwagehourbopa.com or contact:

Employment Relations Division
Montana Department of Labor and Industry
P. O. Box 201503
Helena, MT 59620-1503
Phone 406-444-6543

The department welcomes questions, comments, and suggestions from the public. In addition, we'll do our best to provide information in an accessible format, upon request, in compliance with the Americans with Disabilities Act.

MONTANA PREVAILING WAGE REQUIREMENTS

The Commissioner of the Department of Labor and Industry, in accordance with Sections 18-2-401 and 18-2-402 of the Montana Code Annotated (MCA), has determined the standard prevailing rate of wages for the occupations listed in this publication.

The wages specified herein control the prevailing rate of wages for the purposes of Section 18-2-401, et seq., MCA. It is required each employer pay (as a minimum) the rate of wages, including fringe benefits, travel allowance, zone pay and per diem applicable to the district in which the work is being performed as provided in the attached wage determinations.

All Montana Prevailing Wage Rates are available on the internet at www.mtwagehourbopa.com or by contacting the department at (406) 444-6543.

In addition, this publication provides general information concerning compliance with Montana's Prevailing Wage Law and the payment of prevailing wages. For detailed compliance information relating to public works contracts and payment of prevailing wage rates, please consult the regulations on the internet at www.mtwagehourbopa.com or contact the department at (406) 444-6543.

GALEN HOLLENBAUGH
Commissioner
Department of Labor and Industry
State of Montana

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MONTANA PREVAILING WAGE REQUIREMENTS:

WAGE RATES:

A. Date of Publication January 2, 2020

B. Definition of Building Construction
For the purposes of Prevailing Wage, the Commissioner of Labor and Industry has determined that building construction occupations are defined to be those performed by a person engaged in a recognized trade or craft, or any skilled, semi-skilled, or unskilled manual labor related to the construction, alteration, or repair of a public building or facility, and does not include engineering, superintendence, management, office or clerical work.

The Administrative Rules of Montana (ARM), 24.17.501(2) – 2(a), states *"Building construction projects generally are the constructions of sheltered enclosures with walk-in access for housing persons, machinery, equipment, or supplies. It includes all construction of such structures, incidental installation of utilities and equipment, both above and below grade level, as well as incidental grading, utilities and paving.*

Examples of building construction include, but are not limited to, alterations and additions to buildings, apartment buildings (5 stories and above), arenas (closed), auditoriums, automobile parking garages, banks and financial buildings, barracks, churches, city halls, civic centers, commercial buildings, court houses, detention facilities, dormitories, farm buildings, fire stations, hospitals, hotels, industrial buildings, institutional buildings, libraries, mausoleums, motels, museums, nursing and convalescent facilities, office buildings, out-patient clinics, passenger and freight terminal buildings, police stations, post offices, power plants, prefabricated buildings, remodeling buildings, renovating buildings, repairing buildings, restaurants, schools, service stations, shopping centers, stores, subway stations, theaters, warehouses, water and sewage treatment plants (buildings only), etc."

C. Definition of Public Works Contract
Section 18-2-401(11)(a), MCA defines "public works contract" as *"…a contract for construction services let by the state, county, municipality, school district, or political subdivision or for nonconstruction services let by the state, county, municipality, or political subdivision in which the total cost of the contract is in excess of $25,000…"*.

D. Prevailing Wage Schedule
This publication covers only Building Construction occupations and rates. These rates will remain in effect until superseded by a more current publication. Current prevailing wage rate schedules for Heavy Construction, Highway Construction, and Nonconstruction Services occupations can be found on the internet at www.mtwagehoubopa.com or by contacting the department at (406) 444-6543.

E. Rates to Use for Projects
ARM, 24.17.127(1)(c), states *"The wage rates applicable to a particular public works project are those in effect at the time the bid specifications are advertised."*

F. Wage Rate Adjustments for Multiyear Contracts
Section 18-2-417, MCA states:

"(1) Any public works contract that by the terms of the original contract calls for more than 30 months to fully perform must include a provision to adjust, as provided in subsection (2), the standard prevailing rate of wages to be paid to the workers performing the contract.

(2) The standard prevailing rate of wages paid to workers under a contract subject to this section must be adjusted 12 months after the date of the award of the public works contract. The amount of the adjustment must be a 3% increase. The adjustment must be made and applied every 12 months for the term of the contract.

(3) Any increase in the standard rate of prevailing wages for workers under this section is the sole responsibility of the contractor and any subcontractors and not the contracting agency."

G. Fringe Benefits
Section 18-2-412, MCA states:

"(1) To fulfill the obligation...a contractor or subcontractor may:

(a) pay the amount of fringe benefits and the basic hourly rate of pay that is part of the standard prevailing rate of wages directly to the worker or employee in cash;

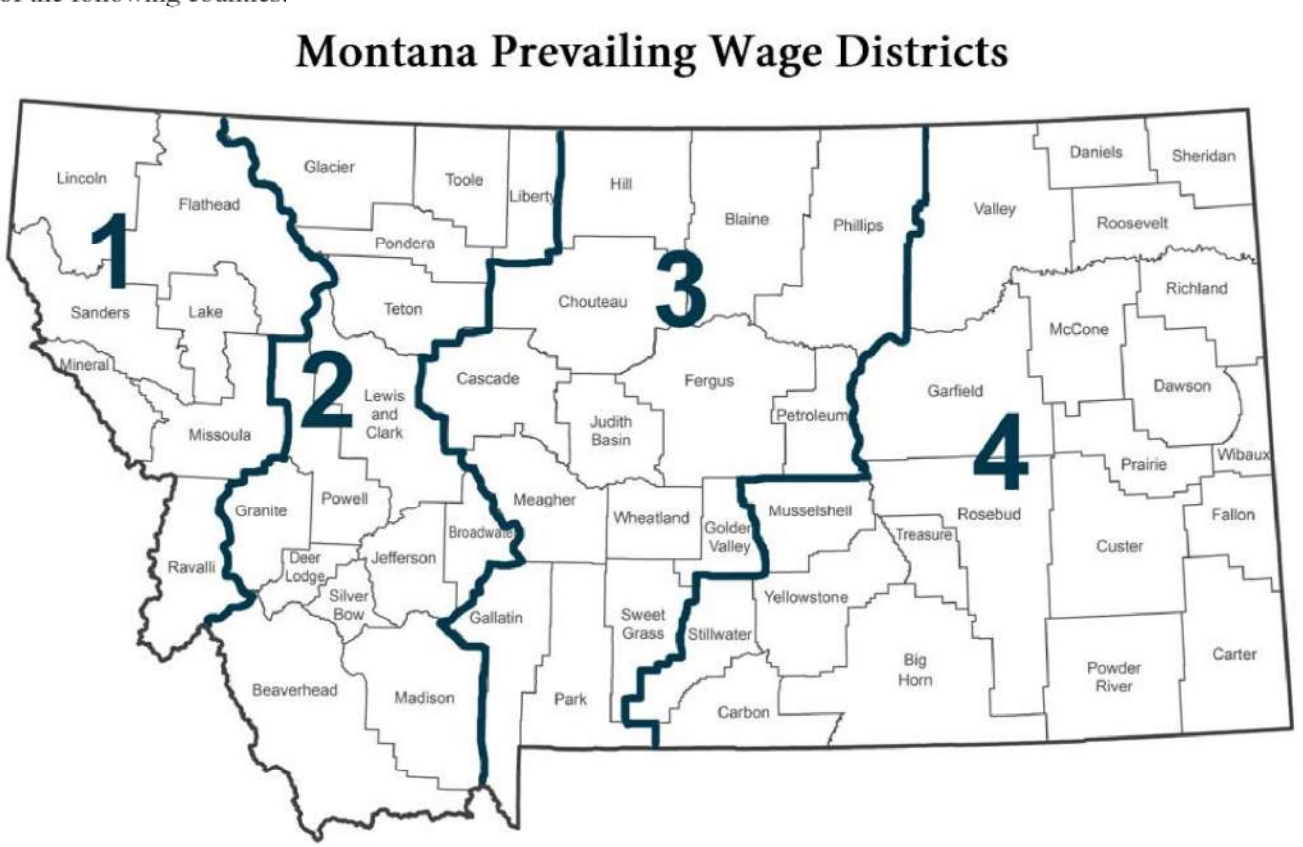
(b) make an irrevocable contribution to a trustee or a third person pursuant to a fringe benefit fund, plan, or program that meets the requirements of the Employee Retirement Income Security Act of 1974 or that is a bona fide program approved by the U. S. department of labor; or

(c) make payments using any combination of methods set forth in subsections (1)(a) and (1)(b) so that the aggregate of payments and contributions is not less than the standard prevailing rate of wages, including fringe benefits and travel allowances, applicable to the district for the particular type of work being performed.

(2) The fringe benefit fund, plan, or program described in subsection (1)(b) must provide benefits to workers or employees for health care, pensions on retirement or death, life insurance, disability and sickness insurance, or bona fide programs that meet the requirements of the Employee Retirement Income Security Act of 1974 or that are approved by the U. S. department of labor."

Fringe benefits are paid for all hours worked (straight time and overtime hours). However, fringe benefits are not to be considered a part of the hourly rate of pay for calculating overtime, unless there is a collectively bargained agreement in effect that specifies otherwise.

H. Prevailing Wage Districts
Montana counties are aggregated into 4 districts for the purpose of prevailing wage. The prevailing wage districts are composed of the following counties:



I. Dispatch City
ARM, 24.17.103(11), defines dispatch city as *"...the courthouse in the city from the following list which is closest to the center of the job: Billings, Bozeman, Butte, Great Falls, Helena, Kalispell, and Missoula."* A dispatch city shall be considered the point of origin only for jobs within the counties identified in that district (as shown below):

> **District 1 – Kalispell and Missoula:** includes Flathead, Lake, Lincoln, Mineral, Missoula, Ravalli, and Sanders;
> **District 2 – Butte and Helena:** includes Beaverhead, Broadwater, Deer Lodge, Glacier, Granite, Jefferson, Lewis and Clark, Liberty, Madison, Pondera, Powell, Silver Bow, Teton, and Toole;
> **District 3 – Bozeman and Great Falls:** includes Blaine, Cascade, Chouteau, Fergus, Gallatin, Golden Valley, Hill, Judith Basin, Meagher, Park, Petroleum, Phillips, Sweet Grass, and Wheatland;
> **District 4 – Billings:** includes Big Horn, Carbon, Carter, Custer, Daniels, Dawson, Fallon, Garfield, McCone, Musselshell, Powder River, Prairie, Richland, Roosevelt, Rosebud, Sheridan, Stillwater, Treasure, Valley, Wibaux, and Yellowstone.

J. Zone Pay
Zone pay is not travel pay. ARM, 24.17.103(24), defines zone pay as *"...an amount added to the base pay; the combined sum then becomes the new base wage rate to be paid for all hours worked on the project. Zone pay must be determined by measuring the road miles one way over the shortest practical maintained route from the dispatch city to the center of the job."* See section I above for a list of dispatch cities.

K. Computing Travel Benefits
ARM, 24.17.103(22), states *" 'Travel pay,' also referred to as 'travel allowance,' is and must be paid for travel both to and from the job site, except those with special provisions listed under the classification. The rate is determined by measuring the road miles one direction over the shortest practical maintained route from the dispatch city or the employee's home, whichever is closer, to the center of the job."* See section I above for a list of dispatch cities.

L. Per Diem
ARM, 24.17.103(18), states *" 'Per diem' typically covers costs associated with board and lodging expenses. Per diem is paid when an employee is required to work at a location outside the daily commuting distance and is required to stay at that location overnight or longer."*

M. Apprentices
Wage rates for apprentices registered in approved federal or state apprenticeship programs are contained in those programs. Additionally, Section 18-2-416(2), MCA states *"...The full amount of any applicable fringe benefits must be paid to the apprentice while the apprentice is working on the public works contract."* Apprentices not registered in approved federal or state apprenticeship programs will be paid the appropriate journey level prevailing wage rate when working on a public works contract.

N. Posting Notice of Prevailing Wages
Section 18-2-406, MCA provides that contractors, subcontractors and employers who are *"...performing work or providing construction services under public works contracts, as provided in this part, shall post in a prominent and accessible site on the project or staging area, not later than the first day of work and continuing for the entire duration of the project, a legible statement of all wages and fringe benefits to be paid to the employees."*

O. Employment Preference
Sections 18-2-403 and 18-2-409, MCA requires contractors to give preference to the employment of bona fide Montana residents in the performance of work on public works contracts.

P. Projects of a Mixed Nature
Section 18-2-408, MCA states:

"(1) The contracting agency shall determine, based on the preponderance of labor hours to be worked, whether the public works construction services project is classified as a highway construction project, a heavy construction project, or a building construction project.

(2) Once the project has been classified, employees in each trade classification who are working on that project must be paid at the rate for that project classification"

Q. Occupations Definitions
You can find definitions for these occupations on the following Bureau of Labor Statistics website:
http://www.bls.gov/oes/current/oes_stru.htm

R. Welder Rates
Welders receive the rate prescribed for the craft performing an operation to which welding is incidental.

S. Foreman Rates
Rates are no longer set for foremen. However, if a foreman performs journey level work, the foreman must be paid at least the journey level rate.

WAGE RATES

BOILERMAKERS

	Wage	Benefit
District 1	$33.17	$30.88
District 2	$33.17	$30.88
District 3	$33.17	$30.88
District 4	$33.17	$30.88

Duties Include:
Construct, assemble, maintain, and repair stationary steam boilers, boiler house auxiliaries, process vessels, and pressure vessels.

Travel:
All Districts
0-120 mi. free zone
>120 mi. federal mileage rate/mi.

Special Provision:
Travel is paid only at the beginning and end of the job.

Per Diem:
All Districts
0-70 mi. free zone
>70-120 mi. $65.00/day
>120 mi. $80.00/day

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BRICK, BLOCK, AND STONE MASONS

	Wage	Benefit
District 1	$28.71	$14.96
District 2	$28.71	$14.96
District 3	$28.71	$14.96
District 4	$28.71	$14.96

Travel:
All Districts
0-45 mi. free zone
>45-60 mi. $32.50/day
>60-90 mi. $62.00/day
>90 mi. $75.00/day

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CARPENTERS

	Wage	Benefit
District 1	$24.00	$13.57
District 2	$24.00	$13.86
District 3	$24.00	$13.57
District 4	$24.00	$13.57

Duties Include:
Install roll and batt insulation, and hardwood floors.

Zone Pay:
All Districts
0-30 mi. free zone
>30-60 mi. base pay + $4.00/hr.
>60 mi. base pay + $6.00/hr.

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CARPET INSTALLERS

No Rate Established

Duties Include:
Lay and install carpet from rolls or blocks on floors. Install padding and trim flooring materials.

Travel and Per Diem:
All Districts
No travel or per diem established.

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CEMENT MASONS AND CONCRETE FINISHERS

	Wage	Benefit
District 1	$22.85	$12.64
District 2	$22.85	$12.64
District 3	$22.85	$12.64
District 4	$22.85	$12.64

Duties Include:
Smooth and finish surfaces of poured concrete, such as floors, walks, sidewalks, or curbs. Align forms for sidewalks, curbs, or gutters.

Zone Pay:
All Districts
0-30 mi. free zone
>30-60 mi. base pay + $2.95/hr.
>60 mi. base pay + $4.75/hr.

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CONSTRUCTION EQUIPMENT OPERATORS GROUP 1

	Wage	Benefit
District 1	$27.91	$13.55
District 2	$27.91	$13.55
District 3	$27.91	$13.55
District 4	$27.91	$13.55

This group includes but is not limited to:
Air Compressor; Auto Fine Grader; Belt Finishing; Boring Machine (Small); Cement Silo; Crane, A-Frame Truck Crane; Crusher Conveyor; DW-10, 15, and 20 Tractor Roller; Farm Tractor; Forklift; Form Grader; Front-End Loader, under 1 cu. yd; Oiler, Heavy Duty Drills; Herman Nelson Heater; Mucking Machine; Oiler, All Except Cranes/Shovels; Pumpman.

Zone Pay:
All Districts
0-30 mi. free zone
>30-60 mi. base pay + $3.50/hr.
>60 mi. base pay + $5.50/hr.

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CONSTRUCTION EQUIPMENT OPERATORS GROUP 2

	Wage	Benefit
District 1	$28.70	$13.55
District 2	$28.70	$13.55
District 3	$28.70	$13.55
District 4	$28.70	$13.55

This group includes but is not limited to:
Air Doctor; Backhoe\Excavator\Shovel, up to and incl. 3 cu. yds; Bit Grinder; Bitunimous Paving Travel Plant; Boring Machine, Large; Broom, Self-Propelled; Concrete Travel Batcher; Concrete Float & Spreader; Concrete Bucket Dispatcher; Concrete Finish Machine; Concrete Conveyor; Distributor; Dozer, Rubber-Tired, Push, & Side Boom; Elevating Grader\Gradall; Field Equipment Serviceman; Front-End Loader, 1 cu. yd up to and incl. 5 cu. yds; Grade Setter; Heavy Duty Drills, All Types; Hoist\Tugger, All; Hydralift Forklifts & Similar; Industrial Locomotive; Motor Patrol (except finish); Mountain Skidder; Oiler, Cranes\Shovels; Pavement Breaker, EMSCO; Power Saw, Self-Propelled; Pugmill; Pumpcrete\Grout Machine; Punch Truck; Roller, other than Asphalt; Roller, Sheepsfoot (Self-Propelled); Roller, 25 tons and over; Ross Carrier; Rotomill, under 6 ft; Trenching Machine; Washing /Screening Plant.

Zone Pay:
All Districts
0-30 mi. free zone
>30-60 mi. base pay + $3.50/hr.
>60 mi. base pay + $5.50/hr.

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CONSTRUCTION EQUIPMENT OPERATORS GROUP 3

	Wage	Benefit
District 1	$29.45	$13.55
District 2	$29.45	$13.55
District 3	$29.45	$13.55
District 4	$29.45	$13.55

This group includes but is not limited to:
Asphalt Paving Machine; Asphalt Screed; Backhoe\Excavator\Shovel, over 3 cu. yds; Cableway Highline; Concrete Batch Plant; Concrete Curing Machine; Concrete Pump; Cranes, Creter; Cranes, Electric Overhead; Cranes, 24 tons and under; Curb Machine\Slip Form Paver; Finish Dozer; Front-End Loader, over 5 cu. yds; Mechanic\Welder; Pioneer Dozer; Roller Asphalt (Breakdown & Finish); Rotomill, over 6 ft; Scraper, Single, Twin, or Pulling Belly-Dump; YO-YO Cat.

Zone Pay:
All Districts
0-30 mi. free zone
>30-60 mi. base pay + $3.50/hr.
>60 mi. base pay + $5.50/hr.

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CONSTRUCTION EQUIPMENT OPERATORS GROUP 4

	Wage	Benefit
District 1	$30.45	$13.55
District 2	$30.45	$13.55
District 3	$30.45	$13.55
District 4	$30.45	$13.55

This group includes but is not limited to:
Asphalt\Hot Plant Operator; Cranes, 25 tons up to and incl. 44 tons; Crusher Operator; Finish Motor Patrol; Finish Scraper.

Zone Pay:
All Districts
0-30 mi. free zone
>30-60 mi. base pay + $3.50/hr.
>60 mi. base pay + $5.50/hr.

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CONSTRUCTION EQUIPMENT OPERATORS GROUP 5

	Wage	Benefit
District 1	$31.45	$13.55
District 2	$31.45	$13.55
District 3	$31.45	$13.55
District 4	$31.45	$13.55

This group includes but is not limited to:
Cranes, 45 tons up to and incl. 74 tons.

Zone Pay:
All Districts
0-30 mi. free zone
>30-60 mi. base pay + $3.50/hr.
>60 mi. base pay + $5.50/hr.

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CONSTRUCTION EQUIPMENT OPERATORS GROUP 6

	Wage	Benefit
District 1	$32.45	$13.55
District 2	$32.45	$13.55
District 3	$32.45	$13.55
District 4	$32.45	$13.55

This group includes but is not limited to:
Cranes, 75 tons up to and incl. 149 tons; Cranes, Whirley (All).

Zone Pay:
All Districts
0-30 mi. free zone
>30-60 mi. base pay + $3.50/hr.
>60 mi. base pay + $5.50/hr.

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CONSTRUCTION EQUIPMENT OPERATORS GROUP 7

	Wage	Benefit
District 1	$33.45	$13.55
District 2	$33.45	$13.55
District 3	$33.45	$13.55
District 4	$33.45	$13.55

This group includes but is not limited to:
Cranes, 150 tons up to and incl. 250 tons; Cranes, over 250 tons—add $1.00 for every 100 tons over 250 tons; Crane, Tower (All); Crane Stiff-Leg or Derrick; Helicopter Hoist.

Zone Pay:
All Districts
0-30 mi. free zone
>30-60 mi. base pay + $3.50/hr.
>60 mi. base pay + $5.50/hr.

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CONSTRUCTION LABORERS GROUP 1/FLAG PERSON FOR TRAFFIC CONTROL

	Wage	Benefit
District 1	$20.65	$10.47
District 2	$20.65	$10.47
District 3	$20.65	$10.47
District 4	$20.65	$10.47

Zone Pay:
All Districts
0-15 mi. free zone
>15-30 mi. base pay + $0.65/hr.
>30-50 mi. base pay + $0.85/hr.
>50 mi. base pay + $1.25/hr.

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CONSTRUCTION LABORERS GROUP 2

	Wage	Benefit
District 1	$20.50	$7.87
District 2	$19.94	$8.73
District 3	$21.40	$6.73
District 4	$20.51	$5.27

This group includes but is not limited to:
General Labor; Asbestos Removal; Burning Bar; Bucket Man; Carpenter Tender; Caisson Worker; Cement Mason Tender; Cement Handler (dry); Chuck Tender; Choker Setter; Concrete Worker; Curb Machine-lay Down; Crusher and Batch Worker; Heater Tender; Fence Erector; Landscape Laborer; Landscaper; Lawn Sprinkler Installer; Pipe Wrapper; Pot Tender; Powderman Tender; Rail and Truck Loaders and Unloaders; Riprapper; Sign Erection; Guardrail and Jersey Rail; Spike Driver; Stake Jumper; Signalman; Tail Hoseman; Tool Checker and Houseman and Traffic Control Worker.

Zone Pay:
All Districts
0-15 mi. free zone
>15-30 mi. base pay + $0.65/hr.
>30-50 mi. base pay + $0.85/hr.
>50 mi. base pay + $1.25/hr.

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CONSTRUCTION LABORERS GROUP 3

	Wage	Benefit
District 1	$21.65	$10.47
District 2	$21.65	$10.47
District 3	$21.65	$10.47
District 4	$21.65	$10.47

This group includes but is not limited to:
Concrete Vibrator; Dumpman (Grademan); Equipment Handler; Geotextile and Liners; High-Pressure Nozzleman; Jackhammer (Pavement Breaker) Non-Riding Rollers; Pipelayer; Posthole Digger (Power); Power Driven Wheelbarrow; Rigger; Sandblaster; Sod Cutter-Power and Tamper.

Zone Pay:
All Districts
0-15 mi. free zone
>15-30 mi. base pay + $0.65/hr.
>30-50 mi. base pay + $0.85/hr.
>50 mi. base pay + $1.25/hr.

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CONSTRUCTION LABORERS GROUP 4

	Wage	Benefit
District 1	$21.67	$10.47
District 2	$22.00	$10.47
District 3	$21.70	$10.47
District 4	$21.93	$10.47

This group includes but is not limited to:
Hod Carrier***; Water Well Laborer; Blaster; Wagon Driller; Asphalt Raker; Cutting Torch; Grade Setter; High-Scaler; Power Saws (Faller & Concrete) Powderman; Rock & Core Drill; Track or Truck Mounted Wagon Drill and Welder incl. Air Arc.

Zone Pay:
All Districts
0-15 mi. free zone
>15-30 mi. base pay + $0.65/hr.
>30-50 mi. base pay + $0.85/hr.
>50 mi. base pay + $1.25/hr.

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DRYWALL APPLICATORS

	Wage	Benefit
District 1	$24.00	$13.57
District 2	$24.00	$13.86
District 3	$24.00	$13.57
District 4	$24.00	$13.57

Duties Include:
Drywall and ceiling tile installation.

Zone Pay:
All Districts
0-30 mi. free zone
>30-60 mi. base pay + $4.00/hr.
>60 mi. base pay + $6.00/hr.

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ELECTRICIANS: INCLUDING BUILDING AUTOMATION CONTROL

	Wage	Benefit
District 1	$31.04	$13.77
District 2	$29.59	$14.56
District 3	$31.05	$13.33
District 4	$34.08	$14.91

Duties Include:
Electrical wiring; equipment and fixtures; street lights; electrical control systems. Installation and/or adjusting of building automation controls also during testing and balancing, commissioning and retro-commissioning.

Travel:
District 1

No mileage due when traveling in employer's vehicle.

The following travel allowance is applicable when traveling in employee's vehicle:

0-15 mi. free zone
>15-45 mi. $0.585/mi. in excess of the free zone.
>45 mi. $75.00/day

District 2
No mileage due when traveling in employer's vehicle.

The following travel allowance is applicable when traveling in employee's vehicle:

0-10 mi. free zone
>10-55 mi. federal mileage rate/mi.
>55 mi. $66.00/day

District 3
No mileage due when traveling in employer's vehicle.

The following travel allowance is applicable when traveling in employee's vehicle:

0-08 mi. free zone
>08-50 mi. federal mileage rate/mi. in excess of the free zone.
>50 mi. $66.00/day

District 4
No mileage due when traveling in employer's vehicle.

The following travel allowance is applicable when traveling in employee's vehicle:

0-18 mi. free zone
>18-60 mi. federal mileage rate/mi.
>60 mi. $75.00/day

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ELEVATOR CONSTRUCTORS

	Wage	Benefit
District 1	$54.09	$34.12
District 2	$54.09	$34.12
District 3	$54.09	$34.12
District 4	$54.09	$34.12

Travel:
All Districts
0-15 mi. free zone
>15-25 mi. $43.25/day
>25-35 mi. $86.49/day
>35 mi. $84.90/day or cost of receipts for hotel and meals, whichever is greater.

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FLOOR LAYERS

No Rate Established

Apply blocks, strips, or sheets of shock-absorbing, sound-deadening, or decorative coverings to floors.

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GLAZIERS

	Wage	Benefit
District 1	$16.98	$2.46
District 2	$18.35	$2.50
District 3	$19.51	$3.73
District 4	$21.26	$3.26

Travel and Per Diem:
All Districts
No travel or per diem established.

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HEATING AND AIR CONDITIONING

	Wage	Benefit
District 1	$27.55	$18.83
District 2	$30.09	$18.83
District 3	$30.09	$18.83
District 4	$30.09	$18.83

Duties Include:
Testing and balancing, commissioning and retro-commissioning of all air-handling equipment and duct work.

Travel:
All Districts
0-50 mi. free zone
>50 mi.
- $0.25/mi. in employer vehicle.
- $0.65/mi. in employee vehicle.

Per Diem:
All Districts
$70/day

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INSULATION WORKERS - MECHANICAL (HEAT AND FROST)

	Wage	Benefit
District 1	$33.37	$19.87
District 2	$33.37	$19.87
District 3	$33.37	$19.87
District 4	$33.37	$19.87

Duties Include:
Insulate pipes, ductwork or other mechanical systems.

Travel:
All Districts
0-30 mi. free zone
>30-40 mi. $25.00/day
>40-50 mi. $35.00/day
>50-60 mi. $45.00/day
>60 mi. $60.00/day plus
- $0.56/mi. if transportation is not provided.
- $0.20/mi. if in company vehicle.

>60 mi. $90.00/day on jobs requiring an overnight stay plus
- $0.56/mi. if transportation is not provided.
- $0.20/mi. if in company vehicle.

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IRONWORKERS - STRUCTURAL STEEL AND REBAR PLACERS

	Wage	Benefit
District 1	$28.00	$26.40
District 2	$27.25	$22.19
District 3	$27.25	$22.19
District 4	$22.92	$22.29

Duties Include:
Structural steel erection; assemble prefabricated metal buildings; cut, bend, tie, and place rebar; energy producing windmill type towers; metal bleacher seating; handrail fabrication and ornamental steel.

Travel:
District 1
0-45 mi. free zone
>45-60 mi. $45.00/day
>60-100 mi. $70.00/day
>100 mi. $90.00/day

Special Provision:
When the employer provides transportation, travel will not be paid. However, when an employee is required to travel over 70 miles one way, the employee may elect to receive the travel pay in lieu of the transportation.

Districts 2, 3 & 4
0-45 mi. free zone
>45-85 mi. $60.00/day
>85 mi. $90.00/day

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MILLWRIGHTS

	Wage	Benefit
District 1	$34.00	$13.57
District 2	$34.00	$13.86
District 3	$34.00	$13.57
District 4	$34.00	$13.57

Zone Pay:
All Districts
0-30 mi. free zone
>30-60 mi. base pay + $4.00/hr.
>60 mi. base pay + $6.00/hr.

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PAINTERS: INCLUDING PAPERHANGERS

	Wage	Benefit
District 1	$23.60	$9.35
District 2	$21.83	$8.13
District 3	$21.06	$8.31
District 4	$21.28	$8.31

Travel and Per Diem:
All Districts
No travel or per diem established.

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PILE BUCKS

	Wage	Benefit
District 1	$31.00	$13.57
District 2	$31.00	$13.86
District 3	$31.00	$13.57
District 4	$31.00	$13.57

Zone Pay:
All Districts
0-30 mi. free zone
>30-60 mi. base pay + $4.00/hr.
>60 mi. base pay + $6.00/hr.

Duties Include:
Set up crane; set up hammer; weld tips on piles; set leads; insure piles are driven straight with the use of level or plum bob. Give direction to crane operator as to speed and direction of swing. Cut piles to grade.

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PLASTERERS

No Rate Established

Travel and Per Diem:
All Districts
No travel or per diem established.

Duties Include:
All materials beyond the substrate, such as a moisture barrier, any type of drainage installation between the moisture barrier and insulation or EPS board, the attachment of the EPS board, installation of fiberglass mesh embedded in the base coat, any water-resistant coat that is applied on top of the insulation to serve as a weather barrier, and the application of the finish coat.

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PLUMBERS, PIPEFITTERS, AND STEAMFITTERS

	Wage	Benefit
District 1	$30.48	$13.56
District 2	$31.30	$16.00
District 3	$31.30	$16.00
District 4	$33.11	$18.71

Duties Include:
Assemble, install, alter, and repair pipe-lines or pipe systems that carry water, steam, air, other liquids or gases. Testing of piping systems, commissioning and retro-commissioning. Workers in this occupation may also install heating and cooling equipment and mechanical control systems.

Travel:
District 1
0-30 mi. free zone
>30-50 mi. $25.00/day
>50-75 mi. $40.00/day
>75 mi. $75.00/day

Special Provision
If transportation is not provided, mileage at $0.35/mi. with a separate free zone of 20 miles is added to the amounts above. However, if the employee is traveling more than 75 miles/day, only subsistence is required.

Districts 2 & 3
0-40 mi. free zone
>40-80 mi. $30.00/day
>80 mi. $60.00/day

Special Provision:
If employer provides transportation, travel pay will be ½ of the amounts listed above unless the employee stays overnight. If the employee chooses to stay overnight, the employee will receive the full amount of travel listed above even if the employer furnishes transportation.

District 4
0-70 free zone
>70 mi.

- On jobs when employees do not work consecutive days: $0.55/mi. if employer doesn't provide transportation. Not to exceed two trips.

- On jobs when employees work any number of consecutive days: $100.00/day.

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ROOFERS

	Wage	Benefit
District 1	$19.26	$6.71
District 2	$19.89	$8.42
District 3	$20.99	$6.32
District 4	$20.63	$5.62

Duties Include:
Metal roofing.

Travel:
District 1
0-50 mi. free zone
>50 mi. $0.35/mi.

District 2 and 3
0-35 mi. free zone
>35 mi. $0.30/mi only when employer doesn't provide transportation.

District 4
0-25 mi. free zone
>25 mi. $0.30/mi only when employer doesn't provide transportation.

Per Diem:
District 1
$60.00/day

District 2 and 3
Employer pays for room + $26.50/day.

District 4
Employer pays for room + $25.00/day.

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SHEET METAL WORKERS

	Wage	Benefit
District 1	$30.09	$18.83
District 2	$30.09	$18.83
District 3	$30.09	$18.83
District 4	$30.09	$18.83

Duties Include:
Testing and balancing, commissioning and retro-commissioning of all air-handling equipment and duct work. Manufacture, fabrication, assembling, installation, dismantling, and alteration of all HVAC systems, air conveyer systems, and exhaust systems. All lagging over insulation and all duct lining.

Travel:
All Districts
0-50 mi. free zone
>50 mi.
- $0.25/mi. in employer vehicle
- $0.65/mi. in employee vehicle

Per Diem:
All Districts
$70.00/day

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SOLAR PHOTOVOLTAIC INSTALLERS

	Wage	Benefit
District 1	$29.59	$14.56
District 2	$31.05	$14.56
District 3	$31.05	$13.33
District 4	$34.08	$14.91

Travel:
District 1

No mileage due when traveling in employer's vehicle.

The following travel allowance is applicable when traveling in employee's vehicle:

0-15 mi. free zone
>15-45 mi. $0.585/mi. in excess of the free zone.
>45 mi. $75.00/day

District 2
No mileage due when traveling in employer's vehicle.

The following travel allowance is applicable when traveling in employee's vehicle:

0-10 mi. free zone
>10-55 mi. federal mileage rate/mi.
>55 mi. $66.00/day

District 3
No mileage due when traveling in employer's vehicle.

The following travel allowance is applicable when traveling in employee's vehicle:

0-08 mi. free zone
>08-50 mi. federal mileage rate/mi. in excess of the free zone.
>50 mi. $66.00/day

District 4
No mileage due when traveling in employer's vehicle.

The following travel allowance is applicable when traveling in employee's vehicle:

0-18 mi. free zone
>18-60 mi. federal mileage rate/mi.
>60 mi. $75.00/day

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SPRINKLER FITTERS

	Wage	Benefit
District 1	$34.35	$21.93
District 2	$34.35	$21.93
District 3	$34.35	$21.93
District 4	$34.35	$21.93

Duties Include:
Duties Include but not limited to any and all fire protection systems: Installation, dismantling, inspection, testing, maintenance, repairs, adjustments, and corrections of all fire protection and fire control systems, including both overhead and underground water mains, all piping, fire hydrants, standpipes, air lines, tanks, and pumps used in connection with sprinkler and alarm systems.

Travel
All Districts

The following travel allowance is applicable when traveling in employee's vehicle.

0-60 mi. free zone
>60-80 mi. $19.00/day
>80-100 mi. $29.00/day
>100 mi. $105.00/day.

Special Provision
When traveling >100 miles, mileage at $0.54/mi. + $8.59 for every 15 miles traveled at beginning and end of job.

The following travel allowance is applicable when traveling in employer's vehicle.

0-100 mi. free zone
>100 mi. $105.00/day

Special Provision
When traveling >100 miles, $8.59 for every 15 miles traveled, at beginning and end of job.

Per Diem:
All Districts

No per diem is applicable when traveling in employee's vehicle

The following per diem is applicable when traveling in employer's vehicle.

0-100 mi. free zone
>100 mi. $105.00/day

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TAPERS

	Wage	Benefit
District 1	$23.60	$9.35
District 2	$21.83	$8.13
District 3	$21.06	$8.31
District 4	$21.28	$8.31

Travel and Per Diem:
All Districts
No travel or per diem established.

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TEAMSTERS GROUP 2

Pilot Car Driver
No Rate Established

	Wage	Benefit
District 1	$28.88	$7.68
District 2	$28.88	$7.68
District 3	$28.88	$7.68
District 4	$28.88	$7.68

This group includes but is not limited to:
Combination Truck & Concrete Mixer; Distributor Driver; Dry Batch Trucks; DumpTrucks & Similar Equipment; Flat Trucks; Lowboys, Four-Wheel Trailers, Float Semitrailer; Powder Truck Driver (Bulk Unloader Type); Servicemen; Service Truck Drivers, Fuel Truck Drivers, Tiremen; Trucks with Power Equipment; Truck Mechanic; Water Tank Drivers, Petroleum Product Drivers.

Zone Pay:
All Districts
No zone pay established.

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TELECOMMUNICATIONS EQUIPMENT INSTALLERS

	Wage	Benefit
District 1	$29.46	$ 8.73
District 2	$24.61	$ 9.80
District 3	$24.71	$ 8.50
District 4	$24.61	$10.18

Duties Include:
Install voice; sound; vision and data systems. This occupation includes burglar alarms, fire alarms, fiber optic systems, and video systems for security or entertainment.

Travel:
All Districts
The federal mileage rate/mi. in effect when travel occurs if using own vehicle.

Per Diem:
All Districts
Employer pays for meals and lodging up to $75.00/day. When jobsite is located in Big Sky, West Yellowstone, and Gardiner, lodging and meals will be provided by the employer for all actual and reasonable expenses incurred.

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TERRAZZO WORKERS AND FINISHERS

No Rate Established

Duties Include:
Finish work on hard tile, marble, and wood tile to floors, ceilings, and roof decks

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TILE AND STONE SETTERS

No Rate Established

Duties Include:
Apply hard tile, stone, and comparable materials to walls, floors, ceilings, countertops, and roof decks.

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RULES OF ON-SITE CONDUCT

Missoula County Public Schools takes the protection and safety of its students and staff very seriously. These Rules of On-Site Conduct apply to all persons or firms engaged in providing on-site work for this project. Failure to abide by these rules may result in the immediate, temporary suspension and/or permanent removal of the offending person or firm from the project, at the sole discretion of the Superintendent and/or the Executive Director of Facilities.

Registered Sex Offenders and Individuals with Convictions involving Crimes against Children or Violence

No person shall be employed for any on-site portions of this project who is a registered sex offender or has been convicted of a crime against a child or crime involving violence in any jurisdiction.

Harassment and Discrimination

Discrimination and harassment in any form or for any reason, including without limitation to, sexual harassment, are prohibited. This includes, but is not limited to, lewd comments, leering, offensive clothing and whistling.

Firearms

No firearms are allowed on District property at any time, including stored in a vehicle.

Contact and interaction with students

No contact or interaction with students is allowed under any circumstances. If approached by a student you must introduce yourself as a member of the project team and then politely decline to engage in conversation and immediately terminate the contact. Avoid putting yourself in a position where students have direct or unsupervised access to you.

Visual Identification

While working on school grounds, workers will be identified according to procedures established by the Construction Manager.

Tobacco, alcohol and illegal drugs

In accordance with district policy and Montana State Law, no tobacco products may be used on school property. All tobacco products must be concealed at all times. No alcohol or illegal drugs are allowed on school property at any time.

or vaping.

Language and Music

Loud or offensive music or language is not allowed, and must be discontinued immediately upon the offending party being notified.

Self-Reporting

If you are accused of any of these violations, or if there is any question about a specific circumstance or situation, immediately report the incident or circumstance to the project superintendent and/or District's Construction Manager, Architect or Engineer.

Situations reported by others:
In the event that an alleged incident is reported to the School District by a student, parent, staff member or any other observer, the named party will be suspended from on-site duties until the issue is fully resolved.

Zero-tolerance policy

The District reserves the right to refuse access to the site of any person either accused or found guilty of a breach of any of the listed rules of conduct.

Accountability

Every person engaged in any on-site work of this project must be issued a copy of these rules and acknowledge, in writing, that they have fully read and understand them. Each employer is required to provide the name and signature of every employee expected to perform work or visit the site. The District reserves the right to spot check any person on the site and to have them immediately removed from District property if their name does not appear on the acknowledgement list.

On-Site Conduct Rules Acknowledgement Sheet

Each sub-contractor is required to provide a current copy of this sheet to the Construction Manager before on-site work begins. Each employee must sign, signifying receipt and understanding of the Rules of On-Site Conduct. The sub-contractor is required to update this list as needed in order to maintain a current list of employees.

Employer _____

Name	Signature	Received Rules

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY OF WORK

A. Work covered by Contract Documents includes installation of a new hot water heating plant including high efficiency boilers, pumps, piping and terminal heaters. Work will include demolition necessary for the heating system replacement.

1.2 CONSTRUCTION CONTRACT

A. Construct Project under single lump-sum contract.

B. Construction Under Other Contracts: Work on Project which may be executed prior to, simultaneous with, or after completion of Work of this Contract, and which is excluded from this Contract include:

1. Hazardous Materials Abatement.
2. Telecommunication and network systems.
3. Security systems.
4. Fully cooperate and coordinate schedule with separate contractors in order for work of separate contracts may proceed smoothly, without interference or delay of either contract.

1.3 WORK RESTRICTIONS

A. Contractor Use Of Premises: Contractor shall have full use of premises for construction operations, including use of site.

B. Assume responsibility for protection and safekeeping of products stored on site under this Contract.

C. Move stored products which interfere with operations of Owner or separate contractors.

D. Conduct operations to ensure least inconvenience to public and to occupied areas.

E. Obtain and pay for use of additional storage or staging areas needed for operations.

F. Do not load structure with weight that would jeopardize its safety.

G. Should it be necessary to use portions of existing streets, sidewalks or right of ways for operations, obtain approval and pay for use of such areas in accordance with requirements of authorities having jurisdiction.

H. Work Rules:

1. The Owner reserves the right to direct the Contractor to immediately remove any individual that the Owner determines has violated the following rules or constitutes a danger or nuisance to students and staff.
2. Behavior:

    a. The Owner will not tolerate inappropriate behavior by any worker on a job site.
    b. The Contractor shall not allow obscene, offensive, or otherwise inappropriate material to be displayed on the project or language.
    c. No permitted use of the school restroom facilities.
    d. Construction Manager-issued identification is to be visibly displayed at all times.
    e. No radios allowed.

3. Fire and Life Safety:

    a. Existing fire alarm to remain operational in all existing and completed spaces throughout all phases of work. Existing fire sprinkler system to remain operational in all buildings and completed spaces throughout all phases of the work.
    b. Where non-compliance with fire and life safety standards are observed, the Owner may stop the work at no additional cost to the Owner or time extension until remedial action is taken. The Contractor shall reimburse the Owner for any fines or penalties levied by the Fire Department or Building Department for violations related to the construction project.
    c. Report all construction spills and/or fires immediately to 911, the District's Security Company, District Office 509-228-5556 and Owner's Project Manager 509-818-3982.

d. The Contractor shall maintain hallways, corridors, egress paths, stairs, exit doors, exterior paths of egress, etc. as required for occupant safety per the final Phasing Plan approved by the Building and Fire Departments. Contractor shall maintain vertical and horizontal fire separation where required. Contractor shall maintain proper storage of construction materials in designated areas.
e. Contractor shall provide temporary egress signage and exit signs as required for building occupants in areas affected by the Project. Coordinate with Owner's Representative and school safety committee.
f. Outdoor operations including storage, staging, delivery, parking, loading and unloading, and construction work shall not impede occupant egress pathways or access required by the Fire Department.

4. Odor Controls:

a. General: The use of solvents and materials that produce noxious fumes, or any product or equipment that adversely impacts air quality shall be subject to approval by the Owner. Contractor shall submit a written procedure for the control of any emissions prior to use that includes the following:
   1) Products to be used (MSDS sheets)
   2) Location of work
   3) Application
   4) Ventilation Plan
   5) Hours of operation
   6) Material handling/storage

b. Equipment and trucks that produce fumes shall not be parked or located near building air intakes, open windows, or doors
   1) Temporary Enclosures

5. Smoking and Vapor Devices:

a. Smoking shall not be permitted within any building or on school property. Smoking shall not be permitted on building rooftops.

6. The Contractor shall provide, maintain, and remove all temporary enclosures, separations, doors and hardware, fences, etc. as required to separate occupied spaces and maintain occupant comfort.
7. Security:

a. Contractor shall protect work, stored products, construction equipment, and construction areas from theft and vandalism and unauthorized entry. Contractor shall be responsible for any theft or vandalism in occupied areas due to inadequate protection in construction zones.

8. Dust:

a. Install and maintain temporary separations as needed to prevent construction-related dust from occupied areas.

b. HVAC Filters: Replace filters regularly as outlined on Mechanical Phasing and Demo Plans.

9. Access:

a. Contractor shall be responsible for installing, maintaining, and controlling secure doors from construction areas into occupied areas. Separating doors shall be equipped at a minimum with necessary panic hardware, temporary construction core, and alarm, and shall be kept closed at all times.

10. Background Checks:

a. In accordance with AIA A201 Paragraph 3.4.3.1, the Contractor shall provide, upon Owner's request, background checks on each of its employees.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 011000

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 QUALITY ASSURANCE

A. Contract is based upon products and standards established in Contract Documents without consideration of proposed substitutions.

B. Products specified define standard of quality, type, function, dimension, appearance and performance required.

C. Substitution proposals are permitted for specified products, except where specified otherwise.

D. Do not substitute products unless substitution has been accepted and approved in writing by Architect/Owner.

1.2 TIME OF SUBSTITUTION REQUESTS

A. Within 30 days after award of Contract or Notice to Proceed, Architect will consider formal substitution requests from Contractor only. Use attached "Substitution Request Form." No requests for substitutions will be accepted after that time without Owner's authorization and with following stipulation.

B. Architect will record time required for evaluating substitutions proposed by Contractor after receipt of bids, and for making changes in the Contract Documents. Whether or not Architect accepts Contractor proposed substitution, Contractor shall reimburse Owner for charges of Architect and Architect's consultants for evaluating each proposed substitution.

C. No additional substitutions will be considered after this initial process unless a substitution is required due to specified product being removed from or unavailable in market place.

1.3 SUBSTITUTION PROCEDURES

A. Limit each request to one proposed substitution.

B. Submit substitution requests on attached form complete with attachments necessary to fully document proposed substitution. Submit in number of copies required for Contractor's use and distribution, plus one copy to be retained by Architect.

C. Copy of required form is bound after last page of this Section. Remove form for making additional copies or request an original copy from Architect.

D. Document each request with supporting data substantiating compliance of proposed substitution with Contract Documents, including:

1. Manufacturer's name and address, product, trade name, model, or catalog number, performance and test data, and reference standards.
2. Itemized point-by-point comparison of proposed substitution with specified product, listing variations in quality, performance and other pertinent characteristics.
3. Reference to article and paragraph numbers in Specification section.
4. Cost data comparing proposed substitution with specified product and amount of net change to Contract Sum.
5. Changes required in other Work.
6. Availability of maintenance service and source of replacement parts, as applicable.
7. Certified test data to show compliance with performance characteristics specified.
8. Samples, when applicable or requested.
9. Other information as necessary to assist Architect's evaluation.

E. A request for substitution for an equivalent product constitutes a representation that Contractor:

1. Has investigated proposed product and determined that it is equal or superior in all respects to specified product.
2. Will provide warranty as required for specified product.
3. Will coordinate installation and make changes to other Work which may be required.
4. Waives claims for additional costs or time extension which may subsequently become apparent.
5. Certifies that proposed product will not affect or delay Construction Progress Schedule.
6. Will pay for changes to building design, including architectural or engineering design, detailing, and construction costs caused by the requested substitution.

F. Substitutions will not be considered when:

1. Indicated or implied on shop drawings or product data submittals without formal request submitted in accord with this Section.
2. Submittal for substitution request has not been reviewed and approved by Contractor.
3. Acceptance will require substantial revision of Contract Documents or other items of the Work, unless substitution is required to bring Project into GMP compliance.
4. Submittal for substitution request does not include point-by-point comparison of proposed substitution with specified product.

1.4 OWNER AND ARCHITECT'S REVIEW

A. Architect will review requests for proposed substitutions and make recommendations to Owner on Substitution Request Form with reasonable promptness.

B. Considerations for acceptance will be based on conformance with Contract Documents, including following as applicable:

1. Physical dimension and clearance requirements to satisfy space limitations.
2. Static and dynamic weight limitations; structural properties.
3. Audible noise levels.
4. Vibration generation.

5. Interchangeability of parts or components.
6. Accessibility for maintenance to allow possible removal or replacement.
7. Design.
8. Colors, textures, and finishes.
9. Compatibility with other materials, products, assemblies, and components.

C. Owner's decision to approve or reject requested substitution will be indicated on Substitution Request Form. Approval of substitution not valid without Owner's signature.

D. Rejection of proposed substitution by Owner requires use of specified product.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

Attachment: Substitution Request Form, 2 pages.

Contractor:

Project:

SUBSTITUTION REQUEST FORM

Note: Limit this Request to one proposed substitution

TO: Architect Date: _____ Request Number _____

FROM: ❑ Contractor ❑ Subcontractor ❑ Supplier ❑ Manufacturer _____

Specified Item: _____

Section: _____ Page: _____ Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone Number: _____

Trade Name: _____ Model Number: _____

Installer: _____ Address: _____ Phone Number: _____

History: ❑ New product ❑ 2 to 5 years old ❑ 5 to 10 years old ❑ More than 10 years old

Differences between proposed substitution and specified product: _____

❑ Point by point comparison data attached - **REQUIRED BY ARCHITECT**

Reason for Not Providing Specified Item: _____

Similar Installations:

Project: _____ Architect: _____

Address: _____ Owner: _____

Date Installed: _____

Project: _____ Architect: _____

Address: _____ Owner: _____

Date Installed: _____

Proposed substitution affects other parts of Work: ❑No ❑Yes; explain

Savings to Owner for accepting substitution: ($_____)

Proposed substitution changes Contract Time: ❑ No ❑ Yes; Add/Deduct _____ days.

Supporting Data Attached:

❑ Product Data ❑ Drawings ❑ Tests ❑ Reports ❑ Samples ❑

Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable is available.
- Proposed substitution will not affect or delay Construction Progress Schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including architectural or engineering design, detailing, and construction costs caused by the requested substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by:

Signature:

Firm:

Address:

Telephone:

Attachments:

ARCHITECT'S REVIEW AND ACTION

- ❑ Approve Substitution - Make submittals in accordance with Specification Section 013300.
- ❑ Approve Substitution as noted – Make submittals in accordance with Specification Section 013300.
- ❑ Reject Substitution - Use specified products. Architect shall not have responsibility for performance of substitution approved by Owner and rejected by Architect.
- ❑ Substitution Request received too late - Use specified products.

Signed by:

Comments

OWNER'S REVIEW AND ACTION (Approval of Substitution not valid without Owner's signature)

- ❑ Substitution approved - Make submittals in accordance with Specification Section 013300.
- ❑ Substitution approved as noted - Make submittals in accordance with Specification Section 013300.
- ❑ Substitution rejected - Use specified products.

Signed by:

Comments

END OF FORM

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SCHEDULE OF VALUES

A. General:

1. Submit at least 15 days prior to submitting first Application for Payment.
2. Upon request of Architect, submit additional data to substantiate accuracy of given values.
3. Approved schedule will be used as basis for reviewing applications for payment.

B. Format:

1. Use AIA Document G703 - *Continuation Sheet* for application and certificate for payment, or use letter size white bond paper following format of AIA Document G703.
2. Contractor's standard form or electronic media printout will be considered on request.
3. Follow 50 Division format established in Table of Contents of Project Manual for listing of categories. Identify each line item by number and title of respective Specification sections.
   a. Identify Schedule of Values with following information:
   b. Project name and location.
   c. Name of the Architect.
   d. Project number.
   e. Contractor's name and address.
   f. Date of submittal.

C. Content:

1. List installed value of each item of Work and each subcontracted item of Work as separate line item to serve as basis for computing values for Progress Payments. Round off values to nearest dollar.
2. For each major subcontract, list products and operations of that subcontract as separate line items.
3. Include in each line item, as applicable, amount specified for allowances.
4. Itemize separate line costs for performance and payment bonds, field supervision, field layout, temporary facilities and controls, and overhead and profit.
5. For items on which payments will be requested for stored products, list sub-values for cost of materials, delivered and unloaded, with taxes paid.
6. Sum of listed values shall equal total Contract Sum.

D. Review and Resubmittals:

1. After Architect's initial review, revise and resubmit as necessary.
2. Revise and resubmit whenever Change Order is issued. Show each Change Order as new line item. Submit revised schedule with next application for payment.

1.2 CONSTRUCTION PROGRESS SCHEDULE

A. Submit initial preliminary schedule 15 days prior to first Application for Payment. Within 7 days after return of reviewed submittal, resubmit revised data.

B. Prepare schedule as horizontal bar chart with separate bar for each major portion of Work or operation, identifying first work day of each week.

C. Content:

1. Show complete sequence of construction by activity, with dates for beginning and completion of each major element of construction.
2. Identify Work of separate stages or phases, separate floors, or other logically grouped activities.
3. Show accumulated percentage of completion of each item, and total percentage of Work completed as of first day of each month.
4. Review specifications and determine availability of products and long-lead items. Identify long lead items on schedule to allow sufficient time for submittals and order placement to obtain item without delaying Work.
5. Provide sub-schedules to define critical portions of entire schedule.

D. Submittal Schedule:

1. Provide separate sub-schedule to construction progress schedule indicating submittal dates and review time allowed for shop drawings, product data, samples and other similar data.
2. Submit schedule submittal 15 days prior to first Application for Payment.
3. Indicate dates reviewed submittals will be required from Architect taking into consideration the quantity of days specified for Architect's review.
4. Allow sufficient time in schedule for resubmittal of disapproved submittals without causing construction delay.
5. Indicate decision dates for selection of finishes and colors.

E. Progress Revisions:

1. Identify activities modified since previous submittal, major changes in scope, changes in dates, and other identifiable changes.
2. Provide narrative report as necessary to define problem areas, anticipated delays, and impact on schedule.
3. Report corrective action taken, or proposed, and its effect.

F. Progress Submittals:

1. Submit revised schedule with each application for payment.
2. Submit in quantity required for distribution, plus 2 copies to be retained by Architect.

G. Distribute copies of reviewed schedule to project site file, subcontractors, suppliers, and other concerned parties.

H. Architect will review construction progress schedules and submittal schedules, and return within 30 working days of receipt.

1.3 PROPOSED PRODUCTS LIST

A. General:

1. Submit at least 15 days prior to submitting first Application for Payment.
2. Submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

C. Listing may be combined with submittal of subcontractor listing required by subparagraph 5.2.1 of General Conditions.

D. Architect will reply in writing within 15 days stating whether there is reasonable objection to listed items. Failure to object to a listed item shall not constitute waiver of requirements of Contract Documents.

1.4 PROPOSED SUBCONTRACTORS AND MANUFACTURERS

A. Submit in writing within 30 days of award of contract complete listing of all subcontractors and manufacturers proposed for Project. Follow specification table of contents for subcontractor and manufacturer listing.

B. Architect will respond in writing within 21 days stating whether or not Owner or Architect have reasonable objection to any proposed subcontractor or manufacturer. Failure to reply constitutes notice of no reasonable objection, however, failure to reply does not alter Contract Document requirements.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 013200

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Related Sections:

1. Section 013100 - Project Management and Coordination: Coordination drawings and layouts.
2. Section 013200 - Construction Progress Documentation: Submittal Schedule and Proposed Products List.

1.2 SUBMITTAL PROCEDURES

A. Schedule submittals to expedite Project in accordance with approved Construction Progress Schedules and in such sequence as to cause no delay in the Work or in the activities of Owner or of separate contractors.

B. Deliver submittals to Architect's office. Submittals accepted only from Contractor.

C. Submit product data, shop drawings, samples, calculations, certificates, manufacturer's instructions, and other items requested within each specification section.

D. Transmit each submittal using form which includes at a minimum:

1. Transmittal Date
2. Project Name and Architect's Project Number
3. Number of submittals included.
4. Submittal Number
5. Submittal Name
6. Date indicated on submittal
7. Indication of other parties copied on transmittal
8. Indication of whether submittal constitutes a Substitution
9. Indication of whether submittal is an initial or resubmittal.

E. Use blue colored paper for informational submittals; white paper for all other submittals.

F. Transmit each submittal using form attached to this Section. Number submittals using Specification section number and unique numeric reference number. Indicate reference number of previous submission for resubmittals.

1. For example, Specification Section - 079200; Reference Number - 02; previous Reference Number - 01.

G. Identify Project, Contractor, subcontractor or supplier, pertinent Drawing sheets and detail numbers, and Specification section number, as appropriate.

H. Example of submittal review stamp is appended to end of this section for information.

I. Apply Contractor's stamp, sign or initial and date certifying that review, verification of products, field dimensions, adjacent construction Work, and coordination of information, is in accordance with requirements of Work and Contract Documents.

J. Submittals will be returned without processing if they have not been reviewed and stamped by Contractor for coordination of work and conformance with the Drawings and Specifications prior to submission to Architect, if they are not initialed or signed by authorized person, if they are not dated, or if it becomes evident that they have not been properly reviewed. Delays resulting therefrom are not responsibility of Architect.

K. Maintain in field office a copy of submittal schedule and log of submittals indicating current status of each item.

L. Prepare submittals using the same units of measurement system (metric or inch-pound) in compliance with requirements stated in Section 014000. Use ASTM E380 and E621 for establishing metric measurements used in submittals.

1.3 PRODUCT DATA

A. Submit quantity of copies required by Contractor, plus 2 copies to be retained by Architect.

B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to Project. Delete inapplicable data.

1.4 SHOP DRAWINGS

A. Submit one reproducible and 2 copies. Only reproducible will be returned to Contractor.

B. Bind in complete sets. Transmit reproducible transparencies in roll form to eliminate folding. Folding of prints is acceptable.

C. Present in clear and thorough manner. Title each drawing with Project name and number; identify each element of drawings by reference to sheet number and detail, schedule, or room number of Contract Documents.

D. Check and coordinate shop drawings of any section or trade with requirements of other sections or trades and as necessary for proper coordination and complete installation of Work.

E. Do not use Contract Drawings for shop drawings. Provide original shop drawings with changes from Contract Drawings clearly indicated. Contractor shall not rely on the receipt of any electronic media from the Architect or engineers for the preparation of any required shop drawings.

F. Show layout, details, materials, dimensions, thicknesses, methods of assembly, attachments, relation to adjoining Work, wiring diagrams, rough-in requirements, and other pertinent data and information.

G. Verify dimensions and field conditions. Clearly indicate field dimensions and field conditions.

H. Submit detail drawings of special accessory components not included in manufacturer's product data.

1.5 SAMPLES

A. Submit quantity required by Contractor, plus 1 set, except where indicated otherwise in Specification sections, to be retained by Architect.

B. Include identification on each sample with full Project information.

C. Submit samples to illustrate functional and aesthetic characteristics of product, including integral parts and attachment devices. Coordinate sample submittals for interfacing Work.

D. Except where specified otherwise, submit samples from full range of manufacturer's standard colors illustrating textures, patterns, and finishes for Architect selection.

E. Where custom colors are specified, submit samples illustrating colors, textures, patterns, and finishes for Architect's review. Architect will advise colors required or furnish samples for color matching.

F. Architect's acceptance of samples is for visual compliance with design intent only and does not constitute acceptance of performance criteria.

1.6 SUPPORT REACTION DESIGN DATA

A. When specified in individual Sections, submit support reaction design data.

B. Furnish separate submittal indicating complete description of loads, forces, and moments transferred to "base building" structure at each point of contact.

C. Include secondary forces resulting from connections used.

D. Do not submit engineering calculations for support reactions.

E. Submit design data bearing seal and signature of professional engineer responsible for design.

1.7 CALCULATIONS

A. When specified in individual Sections, submit calculations.

B. Submit engineering calculations for component sizes, deflections, and connections.

C. Submit calculations bearing seal and signature of registered professional engineer responsible for design.

D. Where existing conditions deviate from Contract Documents or shop drawings, submit calculations for existing condition, including calculations for anticipated corrective action required, and changes to loads transferred to "base building" structure.

1.8 INFORMATIONAL SUBMITTALS

A. Informational submittals upon which Architect is not expected to take responsive action may be so identified in Contract Documents. When professional certification of performance criteria of materials, systems, or equipment is required by Contract Documents, Architect shall be entitled to rely upon accuracy and completeness of such certifications.

B. Types of Informational Submittals:

1. Design data: Submit with shop drawings.
2. Test reports: Submit within two weeks of testing.
3. Certifications:
   a. Submit certifications when specified in individual Specification sections.
   b. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
   c. Certifications may be recent or previous test results on material or product, but must be acceptable to Architect.
   d. Submit welder certifications 2 weeks prior to commencement of welding operations.
   e. Submit manufacturer or fabricator certifications with product data.
   f. Submit certificates of compliance within two weeks following approval or acceptance by authority having jurisdiction.
   g. Submit installation certifications within two weeks following completion of product installation.

4. Engineering Certifications:
   a. Submit certified statement, signed and sealed by professional engineer responsible for design attesting to the following:
      1) Conformity to applicable governing codes.
      2) Conformity to criteria in Contract Documents.
      3) Component parts were designed or selected for locale and application intended.
   b. Submit with shop drawings. Submit prior to fabrication if shop drawings are not required by individual specification sections.

5. Qualification Data:

a. When specified in individual Sections, submit manufacturer's, fabricator's, and installer's qualifications verifying years of experience.
b. Include list of completed projects having similar scope of Work identified by name, location, date, reference names, and phone numbers.
c. Submit manufacturer qualification data with proposed products list.
d. Submit fabricator or installer qualification data with list of subcontractors at least 15 days prior to submitting first Application for Payment.

6. Manufacturer's Instructions:
   a. Refer to Section 016000 for requirements.
   b. When specified in individual Specification sections, submit manufacturer's printed instructions for delivery, storage, assembly, installation, adjusting, finishing, and other pertinent data.
   c. Identify conflicts between manufacturer's instructions and Contract Documents.
   d. Submit with product data.

7. Manufacturer's Field Reports:
   a. Refer to Section 014000 for requirements.
   b. When specified in individual Specification sections, submit written results and findings of manufacturer's field services specified as part of Field Quality Control.
   c. Submit within two weeks following completion of field services covered in individual reports.

C. Quantity: Submit in quantities specified for product data.

1.9 INCOMPLETE AND PARTIAL SUBMITTALS

A. Incomplete Submittal: Submittal not complying with specified submittal requirements.

B. Partial Submittal: Submittal subdivided into components as indicated in submittal schedule and each component submitted separately.

C. Architect will not review incomplete submittals. Complete submittals for each item are required. Submittal will not be considered official until it is complete in every respect. Delays resulting from incomplete submittals are not responsibility of Architect.

1.10 CONTRACTOR REVIEW

A. Review and approve submittals prior to transmittal to Architect; determine and verify field measurements, field construction criteria, manufacturer's catalog numbers, and conformance of submittal with requirements of Contract Documents.

B. Coordinate submittals with requirements of Work and of Contract Documents.

C. Stamp, sign or initial, and date each submittal to certify compliance with requirements of Contract Documents.

D. Do not fabricate products or begin Work which require submittals until approved submittals have been received from Architect.

1.11 ARCHITECT REVIEW

A. Architect will review construction progress schedules, submittal schedules, product lists, shop drawings, product data, and samples and return within 30 working days of receipt.

B. Do not make "Mass" submittals to Architect. “Mass Submittals” are defined as eight or more submittals in four working day contiguous period or 15 or more submittals in one week. If Mass submittals are received, Architect’s review time stated above will be extended as necessary to perform proper review. Architect will review Mass submittals based upon priority determined by Architect after consultation with Owner and Contractor.

C. Informational submittals and other similar data are for Architect’s information and do not require Architect’s responsive action.

D. Submittals stamped "Approved": No corrections or resubmittal required; fabrication may proceed.

E. Submittals stamped "Approved as Noted": Comply with noted corrections and modifications; resubmittal not required; fabrication may proceed. If for any reason noted corrections and modifications can not be fully complied with, resubmit for review requesting clarification; do not proceed with fabrication.

F. Submittals stamped "Disapproved/Resubmit" and "Incomplete/Resubmit": Revise and resubmit for review; do not proceed with fabrication. Disapproved submittals will not be considered valid cause for construction delay.

G. Submittal approval does not authorize changes to Contract requirements unless accompanied by a Change Order, Architect’s Supplemental Instruction, or Construction Change Directive.

H. Architect’s review of samples and mock-ups is for visual compliance with design intent only and does not constitute review or acceptance of performance criteria nor does it constitute acceptance of a change to the Contract Documents.

1.12 RESUBMITTALS

A. Make resubmittals under procedures specified for initial submittals; identify changes made since previous submittal.

B. Architect will record time required to review resubmittals after original submittal and first resubmittal. Contractor shall reimburse Owner for charges of Architect and Architect’s Consultants for reviewing submittal more than 2 times.

1.13 DISTRIBUTION

A. Duplicate and distribute reproductions of shop drawings, product data, samples, and other submittals which bear Architect's stamp of approval, to Project site file, subcontractors, suppliers, other affected contractors, and other entities requiring information.

B. Provide each testing and inspection agency one set of approved submittals for their exclusive use in providing specified quality control testing and inspection services; refer to Section 014500.

C. Provide additional set of approved submittals for Project record documents file; refer to Section 017800.

PART 2 - PRODUCTS

NOT USED

PART 3 - - EXECUTION

NOT USED

END OF SECTION 013300

SUBMITTAL TRANSMITTAL (Submit separate form for each product)

Contractor: Project:

TRANSMITTAL A

To: Contractor _____ Date: _____ Submittal No: _____

From: Subcontractor _____ By: _____ Resubmission ❑ _____

Quantity	Reference Number	Title/Description/ Manufacturer	Specification Section Title, Paragraph / Drawing Detail Reference

- ❑ Submitted for Review and Approval
- ❑ Resubmitted for Review and Approval
- ❑ Complies with Contract Requirements
- ❑ Will be available to meet construction schedule
- ❑ A/E Review Time included in construction schedule
- ❑ Substitution Involved - Substitution Request Attached
- ❑ If Substitution involved, Submission includes full point by point comparative data or Preliminary details
- ❑ Items included in Submission will be ordered immediately upon receipt of approval

Other remarks on above submission:

TRANSMITTAL B

To: Architect - Att: _____ Date Received by Contractor: _____

From: Contractor _____ Date Transmitted by Contractor: _____

Reviewed, Coordinated, and Approved by Contractor

Remarks on above submission:

❑ One copy retained by sender

TRANSMITTAL C

To: Contractor _____ Date Received: _____

From: Architect ❑ Other Signed _____ Dated Returned: _____

- ❑ Approved
- ❑ Approved as noted
- ❑ Disapproved / Resubmit
- ❑ Not subject to review
- ❑ Submission Incomplete; Resubmit
- ❑ Received; No Action Required
- ❑ Full point by point comparative data required to complete approval process
- ❑ Provide File Copy with corrections identified
- ❑ Reproducible copies only returned
- ❑ Remarks on above submission:
- ❑ One copy retained by sender

TRANSMITTAL D

To: Subcontractor _____ Date Received: _____

From: Contractor Signed _____ Dated Returned: _____

Copies ❑ Owner ❑ _____ ❑ _____ ❑ One copy retained by sender

Remarks on above:

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 REGULATORY REQUIREMENTS

A. General: Reference to codes, standards or regulatory requirements made on Drawings or in Specifications are considered an integral part of Contract Documents as minimum requirements. Nothing in Contract Documents should be understood to conflict with laws, by-laws, or regulations of municipal, State, Federal, and other authorities having jurisdiction.

B. Code Requirements: As indicated on Drawings.

1.2 REFERENCE STANDARDS

A. Comply with association, trade, federal, commercial, standards generating organization (such as ANSI and ASTM), and other similar standards referenced within Specification sections, except where more explicit or stringent requirements are indicated or required by Specification or applicable codes.

B. Reference standards include their associated amendments and supplements.

C. Except where a specific date is indicated, date of standard is latest edition in effect at date of Contract Documents, or date of standard required by code.

D. Reference standards have same force and effect as if bound into or copied directly into Contract Documents; standards are made a part of Contract Documents by reference.

E. Contractual relationship of parties to the Contract shall not be altered from Contract Documents by mention or inference otherwise in reference standards.

F. Names and titles of standards are frequently abbreviated. Where acronyms or abbreviations are used in Specifications, they are defined to mean the recognized name of trade association, standards generating organization, governing authority, or other entity applicable to context of text provision.

G. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

H. When indicated by individual Specification section, obtain copy of standard. Maintain copy at Project site during submittals, planning, and progress of specific work, until Substantial Completion.

I. Units of measurements required by specifications govern regardless of units of measurement used in reference standards.

1.3 PROJECT MANUAL CONTENT

A. Sections of Division 01 - General Requirements apply to execution of all sections of the Specifications.

B. Language:

1. Imperative mood of sentence structure is generally used which places verb as first word in sentence. Except as otherwise indicated, requirements expressed imperatively are to be performed by Contractor.
2. In certain circumstances, the language of specifications and other contract documents are of abbreviated type. It implies words and meanings that will be appropriately interpreted. Words such as "the," "shall," "shall be," "Contractor shall," "a," "all," "an," "any," and other similar words are eliminated.
3. Singular words will be interpreted as plural and plural words will be interpreted as singular where applicable and where full context of Contract Documents so indicates.
4. The words "shall be" are implied wherever a colon (:) is used within a sentence or phrase.

C. Specialist Assignments:

1. In certain circumstances, Specification text requires or implies that specific elements of Work are to be assigned to specialists who must be engaged to perform that element of Work. Such assignments are special requirements of Contract.
2. Such assignments are intended to establish which party or entity involved in a specific element of Work is considered as being sufficiently experienced in indicated construction processes or operations to be recognized as "expert" in those processes or operations. Nevertheless, ultimate responsibility for fulfilling Contract requirements remains with Contractor.
3. These requirements should not be interpreted to conflict with enforcement of building codes and similar regulations governing the Work. They are also not intended to interfere with local trade union jurisdictional settlements and similar conventions.

D. Minimum Quality/Quantity:

1. Quality level or quantity shown or specified is intended to be minimum for Work to be performed or provided.
2. Except as otherwise specifically indicated, actual Work may either comply exactly with that minimum within specified tolerances, or may exceed that minimum within reasonable limits.
3. In complying with these requirements, indicated numeric values are either minimums or maximums as noted, or as appropriate for context of requirements.
4. Refer instances of uncertainty to Architect for decision before proceeding.

1.4 SYMBOLS

A. List of Symbols:
Number.

%	Percent.
F	Degrees Fahrenheit.
C	Degrees Celsius.
'	Feet.
"	Inches.
±	Plus to Minus; Plus or Minus.
+/-	Plus to Minus; Plus or Minus.

1.5 DEFINITIONS

A. Basic Contract definitions are included in Conditions of the Contract.

B. And: Conjunction indicating that items in series are to be taken jointly. It may also mean plus or in addition to preceding items in the series.

C. Approved: Where used in conjunction with Architect's response or action, meaning will be held to limitations of Architect's responsibilities and duties as specified in General and Supplementary Conditions. In no case will Architect's approval be interpreted as release of Contractor from responsibilities to fulfill requirements of Contract Documents.

D. Directed, Requested: Terms such as "directed," "requested," "authorized," "selected," "approved," "required," "accepted," and "permitted" mean "directed by Architect," "requested by Architect," and similar phrases. However, no such implied meaning shall be interpreted to extend Architect's responsibility into area of construction supervision.

E. Finish: The manner or method of completion. The final appearance of a surface, including texture, smoothness, sheen, and color, after finishing operations have been performed. Finishing operations include preparation of substrate and application, curing, and protection of specified finish materials.

F. Furnish: Means to supply, purchase, procure and deliver complete with related accessories, ready for assembly, application, installation, and similar operations, as applicable in each instance.

G. Indicated: Refers to graphic representations, notes, or schedules on Drawings, or other paragraphs or Schedules in Specifications, and similar requirements in Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help reader locate the reference. Location is not limited.

H. Install: Means to construct, assemble, erect, mount, anchor, place, connect, apply and similar operations, complete with related accessories, as applicable in each instance.

I. Installer: Entity (person or firm) engaged to perform a particular unit of Work at Project site, including installation, erection, application, repair, patching, and similar required operations. Such entities must be experienced in operations they are engaged to perform.

J. Mold Growth Products: Any organic cellular based product capable of fostering growth of mold. Examples include:

1. Wood based products.
2. Paper based products including paper faced products such as gypsum board and gypsum sheathing.
3. Insulation products.
4. Resins, binders, and adhesives.
5. Wall coverings and carpet backings.

K. Or: Used to introduce any of the possibilities in a series. Items in the series are not required to be taken jointly. It does not mean that individual items in the series are optional requirements.

L. Product: Includes natural and manufactured materials, components, machinery, fixtures, equipment, devices, furnishings, systems, and their associated accessories to be incorporated into the Work.

M. Provide: Means to furnish and install, complete and ready for operations and use for purpose intended.

N. Regulations: Includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within construction industry that control performance of the Work.

O. Similar: Interpreted in its general sense and not as meaning identical. Elements defined as "similar" shall be coordinated in relationship to their location and connection with other parts of the Work.

P. True To Line, Plumb, Level, and Flat: Install Work within following tolerances, except where indicated otherwise:

1. True to line: Allowed deviation from straight line within plus or minus 1/16 inch in one foot; plus or minus 1/8 inch in 10 feet; plus or minus 1/4 inch in 20 feet; and plus or minus 3/8 inch in lengths over 20 feet.
2. Level: Allowed deviation from horizontal plane within plus or minus 1/16 inch in one foot; plus or minus 1/8 inch in 10 feet; plus or minus 1/4 inch in 20 feet; and plus or minus 1/2 inch in lengths over 20 feet.
3. Plumb: Allowed deviation from vertical plane within plus or minus 1/16 inch in one foot; plus or minus 1/8 inch in 10 feet; plus or minus 1/4 inch in 20 feet; and plus or minus 1/2 inch in lengths over 20 feet.
4. Flat: Allowed deviation from flat plane in any planar direction within plus or minus 1/16 inch in one foot; plus or minus 1/8 inch in 10 feet; plus or minus 1/4 inch in 20 feet; and plus or minus 3/8 inch in lengths over 20 feet.
5. Tolerances are not accumulative.

1.6 QUALITY ASSURANCE

A. Supervise performance of Work in such manner and by such means to ensure that Work, whether completed or in progress, will not be subjected to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

B. Monitor quality control over products, suppliers, manufacturers, services, site conditions, and workmanship to ensure Work complies with Contract Documents.

C. Comply with specified reference standards for minimum quality of Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

1.7 MANUFACTURER'S FIELD SERVICES AND REPORTS

A. Submit reports in accordance in accordance with Section 013300.

B. Submit qualifications of field observer 30 days in advance of required observations; observer is subject to approval of Architect.

C. When specified in individual Specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces, quality of workmanship, and conditions of installation as applicable, and to initiate instructions when necessary.

D. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.

E. Submit reports within 7 days of observation. Distribute copies to Architect, Project site file, subcontractor, and other entities requiring information.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 014000

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 QUALITY ASSURANCE

A. Comply with applicable laws and regulations of authorities having jurisdiction.

B. Obtain approval from authorities having jurisdiction for each temporary utility before use. Obtain required certifications and permits. Pay connection fees.

C. Construction Signs:

1. Except for specified sign, no other construction signs will be allowed on site.
2. Sign: Construct and install to withstand 70 mph wind velocity.
3. Graphics Painter: Professional sign painter, minimum 2 years experience.
4. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.
5. Permit: Obtain and pay for permit if required to display sign on Project site. Coordinate requirements with authorities having jurisdiction.

1.2 SCHEDULING

A. Prepare schedule indicating dates for implementation and termination of each temporary utility.

B. At earliest feasible time, when acceptable to Owner, change over from use of temporary utility service to use of permanent utility service.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials for temporary facilities may be new or used suitable for intended purpose, but of adequate capacity for required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

B. Water: Provide potable water approved by local health officials.

2.2 TEMPORARY FIELD OFFICES

A. Field Office:

1. Structurally sound, weathertight, equipped with heating, air conditioning, ventilation system, electric power outlets, lighting, and telephone.
2. Temporary Building: Portable or mobile buildings may be used. Floor raised above ground.
3. When permanent facilities are enclosed with operable utilities, relocate office into building upon written approval of Owner, and remove temporary building.
4. Size:

    a. As required for Contractor's operations.
    b. Provide space in field office for project meetings, with table and chairs to accommodate 6 people.

5. Equip with copier, high speed internet connection, and facsimile telecopier.

2.3 CONSTRUCTION AIDS

A. Provide scaffolds, staging, ladders, stairs, ramps, runways, platforms, railings, chutes, and other devices and equipment necessary to facilitate execution and construction contract administration of Work.

B. Provide cranes, hoists, rigging, material lifts, and other conveyances or apparatus as necessary to facilitate execution of Work.

C. Provide storage areas and sheds sized to storage requirements for products of individual Sections, allowing for access and orderly provision for maintenance and inspection of products to requirements of Section 016000.

2.4 VEHICULAR ACCESS AND CONTROLS

A. Provide signs, signals, traffic cones and drums, flares and lights, and flag equipment of types required by authority having jurisdiction.

2.5 TEMPORARY BARRIERS AND ENCLOSURES

A. Partition performance requirements:

1. Maximum flame spread index of 25 in accordance with ASTM E84.
2. Insulate to "R" value of 11 at 75 degrees F mean temperature in accordance with ASTM C518.

B. Partition Framing Options:

1. Lumber: Stud grade; fire-retardant treated in accordance with AWPA C20.
2. Steel stud framing in accordance with ASTM C645.
3. Provide FSC certified lumber.

C. Gypsum Board: ASTM C1396; Type X for fire-rated assemblies.

D. Plywood: PS-1; fire-retardant treated in accordance with AWPA C27.

E. Polyethylene: Fire-rated, reinforced, polyethylene sheet.

F. Doors:

1. Non-fire-rated partitions: Wood or steel doors and frames.
2. Hardware:

a. Provide each door with hinges, lockset, closer, and dust-tight gasketing.
b. Provide fire-rated hardware on doors in fire-rated partitions.
c. Construction masterkey locksets.

G. Temporary Fence:

1. Contractor Options:

a. Solid wood fencing:
1) Plywood: Exterior type PS-1, C-D Plugged, thickness as appropriate for framing requirements.
2) Framing: 4 by 4 inch treated posts and 2 by 4 inch rails, spaced to support plywood.
3) Paint: Exterior type in colors directed by Architect. Required at surfaces exposed to public view.

b. Open mesh fencing:
1) Fabric: Hot dip galvanized steel wire woven into 2 inch mesh.
2) Framing: Galvanized steel posts or roll-formed sections spaced to support fabric. Equip with top rail and bottom tension wire.

2. Equip with gates and locks.

2.6 CONSTRUCTION SIGN

A. Support Structure and Framing: Wood or metal, in sound condition structurally adequate and suitable for specified finish.

B. Sign Surfaces: New exterior grade plywood with medium density overlay, minimum 23/32 inch thick, sized to minimize joints.

C. Nails, Bolts, and Fasteners: Types and sizes as required, galvanized or corrosion resistant.

D. Primers and Paints: Exterior type, colors as selected by Architect, two coats consisting of an appropriate primer followed by one coat of paint for support structure, framing and sign surfaces.

E. Graphics: Design, sizes, colors, and styles of lettering as selected by Architect. Apply over painted background.

F. Sign: One painted assembly of not less than 32 ft^2 with painted graphics to include:

1. Title of Project.
2. Name of Owner.
3. Names and titles of Architect, Engineer, and Consultants.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install, maintain, and operate temporary utilities and services to ensure continuous operation. Modify and extend systems as Work progresses.

B. Install temporary facilities and controls in manner to produce reasonable uniform appearance, structurally adequate for required purposes, and properly maintained.

C. Modify and relocate temporary facilities and controls as necessary to accommodate progress of Work.

3.2 TEMPORARY ELECTRIC POWER AND LIGHTING

A. Provide temporary electrical service required for power and lighting, arrange provisions with utility company, and pay costs for service and energy consumed. Equip service with meter, main disconnect, and over current protection.

B. Complement existing power service capacity and characteristics as required.

C. Provide electrical service sized to provide adequate temporary power and lighting for construction operations.

D. Provide branch distribution system from temporary power source with distribution boxes and outlets located so that power and lighting is available throughout active work areas.

E. Permanent receptacles may be utilized during construction.

F. Replace receptacle plates and wiring devices damaged during construction.

G. Provide lighting to conduct construction operations.

H. Permanent lighting system may be utilized during construction.

I. Restore permanent lighting systems used during construction to original condition. Maintain lighting and provide routine repairs.

3.3 TEMPORARY HEATING AND VENTILATING

A. Provide heating as necessary to protect materials, products, and finishes from damage due to temperature or humidity.

B. Provide temporary heating and ventilating system that complies with codes and regulations.

C. Except where indicated otherwise in individual Specification sections, maintain minimum ambient temperature of 50 degrees F in enclosed areas where construction is in progress.

D. Provide heating system as necessary to maintain specified conditions during construction.

E. Permanent heating plant may be utilized for source of temporary heat, extended and supplemented with temporary heating devices as required.

F. Provide and pay for costs of supervision, operation, maintenance, fuel, and energy consumed.

G. Mold Prevention: Provide heating and ventilation as necessary to keep mold growth products dry during construction operations until Substantial Completion.

1. Heat and ventilate as required to dissipate excessive humidity.
2. Heat and ventilate as required to properly cure and dry materials.
3. Heat and ventilate as required to dry wet areas and materials before installation of materials susceptible to moisture damage.

    a. Exception: Exterior skin of exterior enclosure assemblies.
    b. Use moisture meter to confirm that materials are sufficiently dry.

4. Remove products exhibiting mold growth from project site, whether built into project or stored on site.

H. Use of permanent heating/ventilating and associated distribution systems will be permitted only upon meeting following requirements:

1. Verify that installation is approved for operation, equipment is lubricated, and filters are in place.
2. Equipment installed complete with accessories, started-up, maintained, serviced, and operated in strict accordance with manufacturer's instructions.
3. Provide and pay for regular replacement of filters and worn or consumed parts.
4. Operation of permanent systems or any portion thereof to provide temporary heat/ventilation does not constitute acceptance of system or portion of system.
5. Immediately before Substantial Completion, completely clean each permanent unit used, install new filters, and perform service functions required for placing units in use and qualifying for specified warranties.

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

3.4 TEMPORARY WATER

A. Provide, maintain, and pay for water service required for construction operations.

B. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.

C. Wash Facilities: Supply with potable water for personnel to wash-up for sanitary condition. Dispose of drainage properly. Provide cleaning compounds appropriate for each condition.

3.5 TEMPORARY FIELD OFFICE

A. Provide temporary field offices at time of project mobilization. Maintain during progress of Work.

3.6 TEMPORARY SANITARY FACILITIES

A. Provide and maintain sanitary facilities and enclosures. Provide temporary facilities until such time that designated permanent facilities become available.

B. Restore permanent facilities used during construction to new condition. Replace damaged fixtures, partitions, and accessories.

3.7 TRAFFIC REGULATION

A. Construction Parking Control:

1. Provide temporary parking areas to accommodate construction personnel.
2. Control vehicular parking to prevent interference with public traffic, access by emergency vehicles, and Owner's operations.
3. Monitor parking of construction personnel's vehicles. Maintain vehicular access to and through parking areas.
4. Prevent parking on or adjacent to access roads or non-designated areas.

B. Flagpersons: Provide trained and equipped flagpersons to regulate traffic when construction operations or traffic encroaches on public traffic lanes.

C. Flares and Lights: Use flares and lights during hours of low visibility to delineate traffic lanes and guide traffic.

D. Access Roads and Approaches:

1. Construct and maintain temporary roads and approaches accessing public thoroughfares to serve construction area.
2. Extend and relocate as Work progress requires. Provide detours necessary for unimpeded traffic flow.
3. Provide and maintain access to fire hydrants free of obstructions.
4. Track-equipped vehicles not allowed on paved areas.
5. Designated existing on-site roads may be used for construction traffic.

6. Keep streets, drives, and walks adjacent to site and haul routes clean and free of dirt, debris, and litter caused by construction operations.

E. Haul Routes:

1. Consult with authority having jurisdiction, establish public thoroughfares to be used for haul routes and site access.
2. Confine construction traffic to designated haul routes.
3. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.

F. Traffic Signs and Signals: Comply with requirements of authorities having jurisdiction.

3.8 TEMPORARY BARRIERS AND ENCLOSURES

A. Provide barriers to prevent unauthorized entry to construction areas, to allow for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations.

B. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

C. Exterior Enclosures:

1. Provide temporary weathertight enclosure at exterior openings to accommodate acceptable working conditions and protection for products, to allow for temporary heating and maintenance of required ambient temperatures identified in specification Sections, and to prevent entry of unauthorized persons.
2. Mold Prevention: Provide temporary weathertight exterior enclosures as required to keep mold growth products dry during construction operations. Refer to Section 014000 for definition of Mold Growth Products.
3. Provide access doors with operating hardware and locks.

D. Site Enclosure Fence:

1. Before construction operations begin, install enclosure fence with lockable entrance gates.
2. Locate where indicated, or enclose entire Project site or portion determined sufficient to accommodate construction operations.
3. Provide minimum 6 foot high fence around construction site.
4. Install in a manner that will prevent people, dogs, and other animals from easily entering site except by entrance gates.
5. Adequately set fence posts to resist vandalism, wind loads, and construction operations.
6. Set fence posts in compacted mixture of gravel and earth or in concrete bases.
7. Provide gates in sizes and at locations necessary to accommodate delivery vehicles and other construction operations.

3.9 TEMPORARY CONTROLS

A. Fire Protection:

1. Comply with local fire protection code and governing authorities.
2. Provide and maintain fire protection including, without limitation, fire extinguishers and other appropriate fire-fighting equipment ready for immediate use.
3. Distribute equipment around site, particularly in immediate vicinity of performance of welding or similar hazardous Work.
4. Store gasoline and other flammable liquids in Underwriter's Laboratories listed safety containers in conformance with recommendations of National Board of Fire Underwriters. Do not store gasoline or other flammable liquid within building.
5. Coordination with permanent fire protection systems:

    a. At earliest feasible date in each area of Project, complete installation of permanent fire protection system, including connected services, and place into operation and use.
    b. Instruct key construction personnel on use of systems.

B. Dust Control:

1. Execute Work by methods to minimize raising dust from construction operations.
2. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

C. Erosion and Sediment Control:

1. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow, and from waste disposal areas. Prevent erosion and sedimentation.
2. Minimize amount of bare soil exposed at one time.
3. Provide temporary measures such as berms, dikes, silt fences, drains, and other soil and erosion control devices required by authorities having jurisdiction.
4. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
5. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

D. Water Control:

1. Provide methods to control surface water to prevent damage to site or adjoining properties.
2. Control fill, grading, and ditching to direct surface drainage away from excavations, pits, tunnels, and other construction areas; and to direct drainage to proper runoff.
3. Protect site from puddling or running water.
4. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

E. Security:

1. Provide security and facilities to protect Work from unauthorized entry, vandalism, and theft.
2. Conduct operations in manner to avoid risk of loss, theft, or damage by vandalism.

3.10 CONSTRUCTION SIGN

A. Install project identification sign within 30 days after commencement of construction.

B. Place at location designated by Architect.

C. Install assembly plumb and level, rigidly braced, framed, and anchored to resist wind load.

D. Maintain signs; repair deterioration and damage.

E. Remove signs, framing, supports, and foundations at completion of Project and restore area.

3.11 TEMPORARY USE OF PERMANENT SYSTEMS

A. When allowed by Specifications, certain items of new permanent systems (equipment) may be used prior to Substantial Completion.

B. Prior to operating permanent equipment, notify Architect in writing of intended usage. Verify equipment is approved for operation and equipment is lubricated and ready for operation. Arrange for, obtain, and pay for necessary approvals, manufacturer's acceptance, inspections, permits, and other provisions necessary for temporary use.

C. Provide and pay for operation, maintenance, and regular replacement of filters, and worn or consumed parts. Use of permanent equipment shall not affect the warranty which begins at Substantial Completion of Project.

3.12 REMOVAL, CLEANING, AND RESTORATION

A. Remove temporary above grade or buried utilities, equipment, facilities, controls, and materials prior to request for Substantial Completion.

B. Remove temporary paving that is not intended for or acceptable for integration into permanent paving.

C. In areas intended for landscaping, remove soil and aggregate fill that does not comply with requirements for fill or subsoil in landscaped areas.

D. Remove materials contaminated with road oil, asphalt, or other compounds harmful to plant growth.

E. Repair or replace street paving, curbs, and sidewalks at temporary entrances as required by authorities having jurisdiction.

F. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.

G. Clean and repair evidence or indication of installation or use of temporary Work.

H. Restore existing facilities and equipment used during construction to original condition. Restore permanent facilities and equipment used during construction to specified condition.

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. General product requirements.

B. Related Sections:

1. Section 017300 - Execution: Protection of installed work.

1.2 BASIC PRODUCT REQUIREMENTS

A. Furnish like products from single manufacturer to greatest extent possible.

B. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for complete installation and intended use and effect.

C. Product Identifications: Nameplates, trademarks, logos, and other identifying marks on products are not permitted on surfaces exposed to view in public areas, interior or exterior. Plumbing, mechanical, and electrical equipment not exposed to public view are excluded from foregoing limitation. Required testing laboratory labels (such as UL, FM, or WH) are also excluded from foregoing limitation.

1.3 PRODUCT OPTIONS

A. Products specified by reference standards: Select any product by any manufacturer which can be shown to comply to referenced documents. Evidence of compliance will be required at time of product data or shop drawing submittals.

B. Products specified by naming several products: Select any product named.

C. Acceptable Product: The term as used in these Specifications is to assist the user in locating the specified product and is not intended to denote sole source for product specified. The acceptable product listed denotes a typical product by one of listed acceptable manufacturers. Products by other listed manufacturers meeting or exceeding listed product or specified criteria may be used without following substitution procedures.

D. Products specified by naming one manufacturer's model or performance criteria with reference to other acceptable or approved manufacturers: Products of other listed manufacturers must meet or exceed model number or criteria specified. Equivalent products by other listed manufacturers may be used without following substitution procedures.

E. Products specified by naming one product or indicating option of selecting equivalent products by stating "equivalent to," "or other approved manufacturers," or other similar language: Submit "Substitution Request Form" for any product not specifically named.

F. Products specified by naming only one product followed by "no substitutions," or other similar language: There is no option.

1.4 PRODUCT DELIVERY REQUIREMENTS

A. Arrange deliveries in accordance with construction progress schedules. Schedule deliveries to allow adequate time for product inspection prior to installation. Schedule shall also take into consideration and allow adequate time for reordering of products damaged during delivery or do not meet Contract requirements.

B. Coordinate to avoid conflict with Work and conditions at site.

C. Deliver products in undamaged condition, in manufacturer's original unopened containers or packaging, with identifying labels intact and legible.

D. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

1.5 PRODUCT STORAGE, AND HANDLING REQUIREMENTS

A. Storage:

1. Store and protect products in accordance with manufacturer's instructions with labels intact and legible.
2. Store environmentally sensitive products in weathertight, climate controlled enclosures.
3. Provide off site storage and protection when site does not permit on site storage.
4. Protect and cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.
5. Arrange storage to permit access for inspection. Periodically inspect to ensure products are undamaged and are maintained under specified conditions.
6. Store loose granular materials on solid flat surfaces in well-drained area. Prevent contamination with other materials.

B. Handling:

1. Handle products in accordance with manufacturer's instructions.
2. Do not load structure during construction by storing products with load greater than structure is calculated to safely support.
3. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

C. Mold Prevention: Take precautions in delivery, handling, and storage of mold growth products to keep them dry until time of installation.

1. Refer to Section 014000 for definition of Mold Growth Products.
2. Only install clean and dry mold growth products.
3. Remove wet or dirty mold growth products from project site.

D. Do not use products in Work which have deteriorated, become damaged, or are otherwise unfit for use.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 PRODUCT INSTALLATION

A. Refer to Section 017300 - Execution.

END OF SECTION 016000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Related Sections:

1. Section 016000 - Product Requirements: Basic Product Requirements.

1.2 EXAMINATION OF CONDITIONS

A. Examine substrates and conditions under which Work is to be performed. Do not commence work over unsatisfactory conditions detrimental to proper and timely execution of Work.

B. Do not proceed with Work until unsatisfactory conditions have been corrected.

C. Commencement of installation constitutes acceptance of conditions and cost of any corrective measures are responsibility of Contractor.

1.3 PREPARATION

A. Require compliance with manufacturer's printed installation instructions, including each step in sequence. Do not omit preparatory steps or installation procedures unless specifically modified or exempted by Contract Documents.

B. Maintain one set of complete instructions at Project site during installation and until completion.

C. Should Project conditions or specified requirements conflict with manufacturer's instructions, request clarification in writing from Architect before proceeding.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 PRODUCT EXECUTION

A. Install, erect, connect, condition, use, adjust, and clean products in accordance with manufacturer's instructions and in conformity with specified requirements.

B. Verify and coordinate clearances, dimensions and installation of adjoining construction, equipment, piping, ducts, conduits, or other mechanical or electrical items or apparatus.

C. Prior to fabrication, field measure actual existing conditions to ensure proper fit.

D. Inspect each item of material or equipment immediately prior to installation. Reject damaged and defective items.

E. Recheck measurements and dimensions of Work, as an integral step of starting each installation. Whenever stock manufactured products are specified, verify actual space requirements for setting or placing into allotted space. No extra cost will be allowed for adjustment of Work to accommodate particular product.

F. Provide attachment and connection devices and methods for securing Work. Secure in place with devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

G. Allow for expansion of materials and building movement.

H. Isolate each unit of Work from incompatible Work as necessary to prevent deterioration and electrolytic action.

I. Clean and perform maintenance on installed Work as frequently as necessary through remainder of construction period. Lubricate operable components to ensure operability without damaging effects.

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

3.2 PROTECTION OF INSTALLED WORK

A. Protect installed Work in manner to prevent damage from subsequent construction operations.

B. Provide special protection where specified in individual Specification sections.

C. Provide temporary and removable materials for protection of installed products. Control activity in immediate work area to minimize damage.

D. Ensure materials, systems, and components will be without damage or deterioration at time of Substantial Completion.

E. Protect finished Work from damage, defacements, stains, scratches, and wear.

F. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

G. Protect finished floors, stairs, and other surfaces from traffic dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

H. Mold Prevention:

1. Provide protection to keep mold growth products dry during construction operations until time of Substantial Completion.
2. Provide temporary protection if permanent protection is not provided in timely manner by sequencing and scheduling of construction operations.

I. Remove or repair damaged items. Remove products exhibiting mold growth.

J. 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.

K. Prohibit traffic from lawn and landscaped areas.

END OF SECTION 017300

SECTION 017329 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes incidental cutting, fitting, and patching within new construction required to complete work or to make its several parts fit together.

1.2 SUBMITTALS

A. Provide submittal only when cutting and patching deviates from what is indicated in the Contract Documents. Submit written request to perform cutting and patching 1 week in advance of cutting or alteration which affects:

1. Structural value or integrity of any element of Project.
2. Integrity or effectiveness of weather exposed or moisture resistant elements or systems.
3. Efficiency, operation, maintenance, or safety of operational equipment.
4. Visual qualities of elements exposed to view.

B. Include in request:

1. Identification of Project.
2. Location and description of affected Work.
3. Description of proposed Work:
    a. Scope of cutting, fitting, patching, or alteration.
    b. Listing of applicable trades.
    c. Proposed products and materials.
    d. Extent of refinishing.
4. Necessity for cutting or alteration.
5. Alternatives to cutting and patching.
6. Effect on structural integrity of Work.
7. Effect on weatherproof integrity of Work.
8. Effect on the building's appearance and significant visual elements.
9. Effect on utilities:
    a. List utilities affected by cutting and patching.
    b. List utilities that will be relocated.
    c. List utilities that will be temporarily out-of-service. Indicate time period of service outage.
10. Date and time of execution.

C. Should conditions or schedule require change of products or methods different than original installation, submit written recommendation to Architect explaining conditions necessitating change and requirements of alternative materials or methods.

D. Approval by Architect to proceed with cutting and patching does not waive Architect's right to later require complete removal and replacement of unsatisfactory work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Primary Products and Materials: Those required for original installation; comply with Specifications for each specific product involved.

PART 3 - - EXECUTION

3.1 EXAMINATION

A. Comply with provisions of Section 017300.

B. After uncovering existing Work, examine conditions affecting installation of products and performance of Work.

3.2 PREPARATION

A. Provide temporary supports to ensure structural integrity of affected portions of Work.

B. Provide devices and methods to protect other portions of Project from damage.

C. Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.

D. Provide materials and control operations to prevent spread of dust in surrounding area. Provide drop cloths or other suitable barriers.

E. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

F. Avoid cutting in service pipes, ducts, or conduit until provisions have been made to bypass them.

3.3 PERFORMANCE

A. Cut into construction to provide for installation of other Work and subsequent fitting and patching required to restore surface to original condition.

B. Cut, fit, patch, excavate, and backfill to complete Work and to:

1. Fit several parts together, to integrate with other work.
2. Uncover portions of work to provide for installation of ill-timed work.
3. Remove and replace defective work.
4. Remove and replace work not conforming to requirements of Contract Documents.
5. Remove samples of installed work as necessary for testing.
6. Provide openings in elements of work for penetrations of plumbing, mechanical, and electrical work.
7. Uncover work to allow for Architect's observation of covered work which has been covered up prior to required observation by Architect.

C. Execute in manner which does not void required or existing warranties.

D. Execute by methods which will prevent damage to other Work and which will produce appropriate surfaces to receive installation of new Work:

1. Use hand or small power tools designed for sawing or grinding, not hammering or chopping.
2. Cut holes and slots as small as possible, neatly to size required, with minimum disturbance of adjacent surfaces.
3. Temporarily cover openings when not in use.
4. To avoid marring existing finished surfaces, cut or drill from exposed or finished side into concealed surfaces.
5. Cut through concrete and masonry using cutting machine, such as Carborundum saw or diamond-core drill.

E. Execute excavating and backfilling by methods in accordance with applicable Sections of Division 31 which will prevent settlement or damage to Project.

F. Execute fitting and adjustment to produce finished installation complying with specified products, functions, tolerances, and finishes.

G. Restore surfaces which have been cut, removed, or damaged, to match existing conditions.

H. Install products and materials to complete Work in accordance with requirements of Contract Documents.

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

J. Do not cut and patch structural elements in manner that would result in reduction of load carrying capacity or of load deflection ratio.

K. Do not cut and patch operational elements or safety related components in manner that would result in reduction of their capacity to perform in manner intended, including energy performance, that would result in increased maintenance, decreased operational life, or decreased safety.

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

M. Where utilities are to be removed, relocated, or abandoned, by-pass before cutting. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe, duct, or conduit to prevent entrance of moisture or matter after by-passing and cutting.

N. Except where indicated otherwise, restore exposed finishes of patched areas to match adjacent surface and where necessary extend finish restoration into adjacent surfaces in manner which will eliminate evidence of patching and refinishing. Thoroughly clean surfaces prior to application of paint and other finishes.

O. Where patching occurs in previously painted surface, provide appropriate prime coat followed by first finish coat of paint. Provide final finish coat over entire area containing patch; for continuous surface extend to nearest vertical break or intersection, for an assembly refinish entire unit. Except where indicated otherwise, finish in sheen and color to match existing.

3.4 CLEANING

A. Thoroughly clean areas and spaces affected by Work. Completely remove paint, mortar, oils, putty, and items of similar nature.

B. Restore damaged surfaces to its original condition.

END OF SECTION 017329

SECTION 017400 - CLEANING AND WASTE MANAGEMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Construction and final cleaning prior to Certification of Substantial Completion.
2. Recycling nonhazardous demolition and construction waste.
3. Disposing of nonhazardous demolition and construction waste.

1.2 SYSTEM DESCRIPTION

A. Execute cleaning during progress of work and at completion of work as required by this section and the Conditions of the Contract.

B. Hazards Control:

1. Store volatile wastes in covered safety containers.
2. Remove containers from premises daily.
3. Prevent accumulation of waste which creates hazardous conditions.
4. Provide adequate ventilation during use of volatile or noxious substances.

C. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

1. Do not burn or bury rubbish and waste materials on Project site.
2. Do not dispose of volatile wastes or hazardous materials such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
3. Do not dispose of wastes into streams or waterways.

D. Recycle Requirements: Owner's goal is to recycle as much nonhazardous demolition and construction waste as possible.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS

A. Use only materials and methods recommended by manufacturer of material being cleaned.

B. Do not use materials which will create hazards to health or property, or which will damage surfaces.

C. Provide covered containers for deposit of waste materials, debris, and rubbish.

PART 3 - EXECUTION

3.1 CLEANING DURING CONSTRUCTION

A. Execute periodic cleaning to keep building, site, and adjacent properties free of accumulations of waste materials, debris, rubbish, and wind blown debris resulting from construction operations.

B. Prior to Substantial Completion remove construction tools, scaffolding, equipment, machinery, and surplus materials.

C. Broom clean and vacuum interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Schedule cleaning operations so that dust and other contaminants will not fall on or adhere to wet or newly-coated surfaces.

E. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing space.

F. Do not throw materials from heights.

G. Open free-fall chutes not permitted. Terminate closed chutes into appropriate containers with lids.

H. Collect and remove waste materials, debris, and rubbish from site periodically until execution of final cleaning and dispose off site in lawful manner.

3.2 FINAL CLEANING

A. Comply with manufacturer's instructions.

B. Remove tools, construction equipment, machinery, and surplus material from Project site.

C. Employ experienced personnel or professional cleaning firm.

D. Cleaning:

1. Clean exposed exterior and interior hard-surfaced finishes to dirt-free condition, free of stains, films, and similar foreign substances.
2. Remove labels which are not required as permanent labels.
3. Clean glossy materials to polished condition; remove foreign substances.
4. Polish reflective surfaces to clear shine.
5. Glass and glazing:
   a. Wash and clean mirrors and both sides of glass.

b. Remove putty and other substances which obscure vision.
c. Replace chipped, scratched, and broken glass.

6. Clean concrete floors in unoccupied spaces.
7. Clean resilient flooring, stone flooring, tile, pavers, and other similar hard-surface flooring, including associated bases. Refer to individual Specification sections for requirements of sealing, buffing, waxing, and polishing.
8. Clean carpet and similar soft surfaces, removing debris, soil, and excess nap.
9. Clean exposed surfaces of equipment; remove excess lubrication.
10. Clean plumbing fixtures, drinking fountains, and similar equipment to sanitary condition.
11. Clean light fixtures and lamps; replace burned-out lamps.

E. Avoid disturbing natural weathering of exterior surfaces.

F. Heating, Ventilating, and Air Conditioning Systems:

1. Clean permanent filters and replace disposable filters for units operated during construction.
2. Clean ducts, blowers, and coils for units operated without filters during construction.

G. Site:

1. Clean areas disturbed by construction activities, including landscape areas, free of rubbish, litter and foreign substances.
2. Sweep paved areas to broom clean condition.
3. Remove stains, spills, and other foreign deposits.
4. Rake grounds that are neither paved nor planted to even-textured surface.

H. Remove waste, foreign matter, and debris from roofs, gutters, areaways, and drainage systems.

I. Prior to final completion, conduct inspection of sight-exposed interior surfaces, exterior surfaces, and associated work areas to verify that entire Work is clean.

J. Maintain cleaning until Project, or portion thereof, is accepted by Owner.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General:

1. Recycle paper and beverage containers used by on-site workers.
2. Handling:
   a. Clean materials that are contaminated prior to placing in collection containers. Deliver materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to recycling process.
   b. Arrange for collection by or delivery to the appropriate recycling or reuse facility.

B. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.

1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
   a. Inspect containers and bins for contamination and remove contaminated materials if found.

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

3.4 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION 017400

SECTION 017500 - STARTING AND ADJUSTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Perform operations in following order prior to request for Substantial Completion:

1. Starting of Systems
2. Testing, Adjusting, and Balancing
3. Demonstration of Systems
4. Instruction of Owner's designated personnel.

B. Related Sections:

1. Section 015000 - Temporary Facilities and Controls: Temporary use of permanent systems prior to Substantial Completion.
2. Section 017800 - Closeout Submittals: Operations and maintenance manuals, and warranties and bonds.

1.2 SUBMITTALS

A. General: Submit in accordance with Section 013300.

B. Submit following items as required by this Section:

1. Systems Startup Report.
2. Testing and Balancing Report.
3. Commissioning Report.
4. Record of Owner's Instructions.

1.3 STARTING OF SYSTEMS

A. Coordinate schedule for startup of various equipment and systems.

B. Notify Architect and Owner at least 7 days prior to startup of each item.

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

D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by contract documents and equipment or system manufacturer.

E. Verify wiring and support components for equipment are complete and tested.

F. Execute startup under supervision of applicable manufacturer's representatives and Contractor's personnel in accordance with manufacturer's instructions.

G. 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 startup, and to supervise placing equipment or system in operation.

H. Submit manufacturer's field report in accordance with Section 014000 stating that equipment or system has been properly installed and is functioning correctly.

1.4 TESTING, ADJUSTING, AND BALANCING (TAB)

A. Refer to Division 23 specification section on testing, adjusting, and balancing.

B. TAB firm will perform services specified in Division 23 prior to demonstration of system to Owner.

C. Submit reports by TAB firm, in accordance with Section 014500, to Architect indicating observations and results of tests and indicating compliance or non-compliance with Contract Document requirements.

1.5 DEMONSTRATION

A. Demonstration is for verification that systems will start and operate properly.

B. Demonstrate systems operation to Owner's personnel prior to performing instruction of Owner's personnel.

C. Demonstrate Project equipment by qualified manufacturers' representative who is knowledgeable about Project requirements and operation and maintenance of equipment being demonstrated.

D. For equipment or systems requiring seasonal operation, perform demonstration for other season within 6 months.

E. Demonstrate startup, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment.

F. Prepare and insert additional data in operations and maintenance manuals required by Section 017800 when need for additional data becomes apparent during instruction.

1.6 INSTRUCTION OF OWNER'S PERSONNEL

A. Prior to Substantial Completion, fully instruct Owner's designated operation and maintenance personnel in operation, adjustment, and maintenance of products, equipment and systems requiring regular maintenance. Perform instructions within continuous period of 30 days. For equipment that requires seasonal operation, provide similar instruction during other seasons.

B. Arrange and pay for services of qualified manufacturer's representatives to fully instruct Owner on specialized portions of installation, such as refrigeration machines, automatic controls, water treatment, and electrical systems.

C. Use operations and maintenance manual as basis of instruction. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance. Include detailed review of following items:

1. Maintenance manuals.
2. Record documents.
3. Spare parts and materials.
4. Tools.
5. Lubricants.
6. Fuels.

D. Submit complete record of instructions as part of operations and maintenance manual given to Owner. For each instructional period, supply following data:

1. Date.
2. System or equipment involved.
3. Names of persons giving instructions.
4. Other persons present.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 017500

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Related Sections:

1. Section 015000 - Temporary Facilities and Controls: Temporary use of permanent systems prior to Substantial Completion.
2. Section 017500 - Starting and Adjusting: Starting of systems, testing and balancing, demonstrations, and instruction of Owner's personnel.

1.2 PREREQUISITES TO SUBSTANTIAL COMPLETION

A. Complete items in following paragraphs before requesting Certification of Substantial Completion, either for entire Work or for portions of Work.

B. Conduct inspection to substantiate basis for request that Work is substantially complete. Create comprehensive list (initial punch list) indicating items to be completed or corrected, value of incomplete or non-conforming work, reason for being incomplete, and date of anticipated completion for each item. Include copy of list with request for Certificate of Substantial Completion.

C. Submit statement showing accounting of changes to Contract Sum.

D. Advise Owner of pending insurance change-over requirements at final payment.

E. Obtain and submit releases enabling Owner's full, unrestricted use of Project and access to services and utilities. Include certificate of occupancy, operating certificates, and similar releases from authorities having jurisdiction and utility companies.

F. Submit project record documents in compliance with Section 017800, maintenance manuals, digital images of construction photographs, and other similar final record data.

G. Deliver tools, spare parts, extra stocks of material, and similar physical items to Owner.

H. Make final change-over of locks eliminating construction masterkey system and transmit keys directly to Owner. Advise Owner's personnel of change-over in security provisions.

I. Comply with requirements of Section 015000 for restoring permanent systems operated prior to Substantial Completion.

J. Complete facility startup, testing, adjusting, and balancing of systems and equipment, demonstrations, and instructions to Owner's operating and maintenance personnel as specified in Section 017500.

K. Discontinue or change over and remove temporary facilities and services from Project site, along with construction tools, mock-ups, and similar elements.

L. Perform final cleaning in accordance with Section 017400.

M. Touch-up and otherwise repair and restore marred exposed finishes.

1.3 SUBSTANTIAL COMPLETION REVIEW

A. When Contractor considers Work to be substantially complete, submit to Architect:

1. Written certificate that Work, or designated portion, is substantially complete.
2. List of items to be completed or corrected (initial punch list).

B. Within 7 days after receipt of request for Substantial Completion, Architect will make site review to determine whether Work or designated portion is substantially complete following procedures indicated in Conditions of the Contract.

C. Should Architect determine that Work is not substantially complete:

1. Architect will promptly notify Contractor in writing, stating reasons for its opinion.
2. Contractor shall remedy deficiencies in Work and send second written request for Substantial Completion to Architect.
3. Architect will re-perform review of Work.

D. When Architect finds that Work is substantially complete, Architect will:

1. Prepare Certificate of Substantial Completion on AIA Form G704, accompanied by Contractor's list of items to be completed or corrected as verified and amended by Architect and Owner (final punch list). If Contractor fails to generate initial punch list, or if Architect adds more than 500 items to Contractor's list, or ten or more items per room on average, Owner will re-imburse Architect for time spent in adding to or generating list, and will deduct amount of compensation from payment to Contractor.
2. Submit Certificate to Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate.

E. After Work is substantially complete, Contractor shall:

1. Allow Owner occupancy of Project under provisions stated in Certificate of Substantial Completion.
2. Complete work listed for completion or correction within time period stipulated.

1.4 PREREQUISITES FOR FINAL COMPLETION

A. Complete items in following paragraphs before requesting final acceptance and final payment. List known exceptions, if any, in request.

B. When Contractor considers Work to be complete, submit written certification that:

1. Contract Documents have been reviewed.
2. Work has been examined for compliance with Contract Documents.
3. Work has been completed in accordance with Contract Documents.
4. Work is completed and ready for final inspection.

C. Submit final punch list indicating all items have been completed or corrected.

D. Submit final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.

E. Submit specified warranties, workmanship/maintenance bonds, maintenance agreements, and other similar documents in accordance with Section 017800.

F. Submit updated accounting statement for final changes to Contract Sum.

G. Submit consent of surety to final payment.

H. Perform final cleaning for Contractor soiled areas in accordance with Section 017400.

1.5 FINAL COMPLETION REVIEW

A. Within 7 days after receipt of request for final review, Architect will make site review to determine whether Work or designated portion is complete following procedures indicated in Conditions of the Contract.

B. Should Architect consider Work to be incomplete or defective:

1. Architect will promptly notify Contractor, in writing, listing incomplete or defective work.
2. Contractor shall take immediate steps to remedy stated deficiencies and send second written request to Architect that Work is complete.
3. Architect will reinspect Work.

1.6 REVISITS FOR SITE REVIEWS

A. Should Architect have to re-perform site reviews due to failure of Work to comply with claims of completion made by Contractor, Owner will reimburse Architect for such additional services and will deduct amount of compensation from final payment to Contractor.

1.7 EVIDENCE OF PAYMENTS AND RELEASE OF LIENS

A. Submit Contractor's affidavit of Payment of Debts and Claims on AIA Document G706.

B. Submit Contractor's affidavit of Release of Liens on AIA Document G706A with:

1. Consent of Surety to Final Payment: AIA G707.

2. Contractor's Release or Waiver of Liens.
3. Separate releases or waivers of liens from subcontractors, suppliers and others with lien rights against property of Owner, together with list of those parties.

C. Execute submittals before delivery to Owner.

1.8 FINAL ADJUSTMENT OF ACCOUNTS

A. Submit final statement of accounting to Architect.

B. Show adjustments to Contract Sum:

1. Original Contract Sum.
2. Additions and deductions resulting from:

   a. Previous Change Orders.
   b. Allowances.
   c. Unit Prices.
   d. Deductions for uncorrected Work.
   e. Deductions for inspection payments.
   f. Other adjustments.

3. Total Contract Sum as adjusted.
4. Previous payments.
5. Retainage.
6. Sum remaining due.

C. Architect will prepare final Change Order reflecting approved adjustments to Contract Sum which are not included in Change Orders previously processed.

1.9 FINAL APPLICATION FOR PAYMENT

A. Submit final Application for Payment in accordance with procedures and requirements stated in Conditions of the Contract.

PART 2 - - PRODUCTS

NOT USED

PART 3 - - EXECUTION

NOT USED

END OF SECTION 017700

SECTION 017800 - CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.1 RECORDING

A. Post changes and modifications to record documents as they occur. Do not wait until end of Project. Architect will periodically review record documents to assure compliance with this requirement.

1.2 SUBMITTAL

A. Deliver closeout submittals and samples to Architect for transmittal to Owner.

B. Include typed list identifying each item submitted as closeout document.

1.3 OPERATIONS AND MAINTENANCE MANUALS

A. Prepare data in form of instructional manual in heavy-duty three-ring binders with durable plastic covers.

1. Where written instructions are required, use personnel skilled in technical writing to extent necessary for communication of essential data.
2. Where drawings or diagrams are required, use personnel capable of preparing drawings clearly in understandable format.

B. Examine for completeness.

C. Submit one copy of completed volumes in final form after instructing Owner's personnel under Section 017500, but prior to request for Substantial Completion. This copy will be returned with Architect's comments. Revise as necessary prior to final submittal.

D. Prepare and insert additional data in manuals when need for such data becomes apparent during Owner's instruction.

E. Submit 3 copies of final volumes at time of request for Substantial Completion.

F. Label covers and spine of each binder with typed or printed title OPERATIONS AND MAINTENANCE MANUAL, title of project, and subject matter of binder when multiple binders are required.

G. Separate contents with tab dividers, logically organized with tab title clearly printed under reinforced laminated plastic tabs.

H. Manuals shall contain:

1. Table of contents.
2. Directory listing names, addresses, and telephone numbers of Architect, Engineer, and Contractor.
3. List names, addresses and telephone numbers of subcontractors, suppliers, and service representatives, including local source of supplies and replacement parts.
4. General system or equipment description.
5. Copies of applicable shop drawings and product data.
6. Mark product data to clearly identify specific products and component parts.
7. Supplement product data with drawings necessary to illustrate relationship of component parts of equipment and systems, include control and flow diagrams.
8. Arranged by product, system, or process flow, and subdivided by Specification section. Identify following:

    a. Significant design criteria.
    b. List of equipment.
    c. System or equipment identification, including:

        1) Name of manufacturer.
        2) Model number.
        3) Serial number of each component.

    d. Parts list for each component.
    e. Operating instructions.
    f. Maintenance instructions and schedules for equipment and systems.
    g. Emergency instructions.
    h. Wiring and piping diagrams.
    i. Inspection and test procedures.
    j. Precautions against improper use and maintenance.

9. Copies of warranties.
10. Protective plastic jackets: Provide protective transparent plastic jackets designed to enclose diagnostic software for computerized electronic equipment.
11. Text material:

    a. Provide manufacturer's standard printed material or typewritten specially prepared data.
    b. Provide text on 8-1/2 inches by 11 inches, 20 pound white bond paper.

12. Drawings and diagrams:

    a. Provide reinforced punched binder tabs on drawings and bind in with text.
    b. Oversize drawings:

        1) Fold drawings to same size as text pages and use as fold-out.
        2) Drawings too large to be used as fold-out, place folded drawing in front or rear pocket of binder. Insert typewritten page indicating drawing title, description of contents, and drawing location at appropriate location in manual.

1.4 MATERIAL AND FINISHES MAINTENANCE MANUAL

A. Manual:

1. Submit 3 copies of each manual, in final form, on material and finishes to Architect for distribution.
2. Provide one section for interior products, including applied materials and finishes, and second for products designed for exterior products.

B. Interior Products:

1. Provide manufacturer's data and instructions on care and maintenance of architectural products, including applied materials and finishes.
2. Product data: Provide complete information on architectural products, including following, as applicable:

    a. Manufacturer's catalog number.
    b. Size.
    c. Material composition.
    d. Color.
    e. Texture.
    f. Reordering information for specially manufactured products.

3. Care and maintenance instructions: Provide information on care and maintenance including manufacturer's recommendations for types of cleaning agents to be used and methods of cleaning. Provide information regarding cleaning agents and methods that could prove detrimental to product. Include manufacturer's recommended schedule for cleaning and maintenance.

C. Exterior Products:

1. Provide complete manufacturer's data with instructions on inspection, maintenance, and repair of products exposed to weather or designed for moisture-protection purposes.
2. Manufacturer's data: Provide manufacturer's data giving detailed information, including following, as applicable.

    a. Applicable standards.
    b. Chemical composition.
    c. Installation details.
    d. Inspection procedures.
    e. Maintenance information.
    f. Repair procedures.

1.5 SPARE PARTS AND MAINTENANCE MATERIALS

A. Provide tools, spare parts, maintenance and extra stock materials in quantities specified in individual Specification sections.

B. Deliver to Project site and place in locations as directed; obtain receipt from subcontractors and suppliers.

C. Submit letter at time of inspection for Substantial Completion listing items and quantities; attach receipts.

1.6 WARRANTIES AND BONDS

A. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of warranty on Work that incorporates products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with Contractor.

B. Owner's Recourse:

1. Written warranties made to Owner are in addition to implied warranties, and shall not limit duties, obligations, rights and remedies otherwise available under law.
2. Warranty periods shall not be interpreted as limitations on time in which Owner can enforce such other duties, obligations, rights, or remedies.
3. Rejection of warranties: Owner reserves right to reject warranties and to limit selections to products with warranties not in conflict with requirements of Contract Documents.

C. Submit 3 copies of warranties, maintenance bonds, and maintenance/service contracts as specified in various Specification sections. Include one copy of each warranty in Operations and Maintenance Manual, or in Material and Finishes Maintenance Manual.

D. Assemble data in heavy-duty three-ring binders with durable plastic covers, two required.

E. Label cover and spine of each binder with typed or printed title WARRANTIES AND BONDS and title of Project.

F. Prepare table of contents in sequence of table of contents of Project Manual, with each item identified with number and title of Specification section in which specified, and name of product or work item.

G. Separate each warranty, bond, or service contract with tab and index sheets keyed to listing in table of contents. Provide full information, using separate typed sheets as necessary. List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

H. Obtain warranties, bonds, and maintenance/service contracts executed in triplicate by responsible subcontractors, suppliers, and manufacturers; warranties commence on Date of Substantial Completion.

I. Verify that documents are in proper form, contain full information, and are notarized.

J. Time of Submittals:

1. Submit binders containing warranties, bonds, and maintenance/service contacts within 10 days after date of Substantial Completion.
2. For equipment or component parts of equipment put into service during construction with Owner's permission, submit photo copies of documents within 10 days after acceptance listing date of acceptance as beginning of warranty period. Retain originals of executed documents for final submittal as indicated in subparagraph above.
3. For items of Work when acceptance is delayed beyond date of Substantial Completion, submit within 10 days after acceptance listing date of acceptance as beginning of warranty period.

1.7 RECORD DOCUMENT REQUIREMENTS

A. Maintain at Project site record copy of:

1. Project Manual.
2. Contract Drawings.
3. Addenda.
4. Change Orders, Change Directives, Supplemental Instructions, and other modifications to Contract.
5. Approved shop drawings, product data, samples, and similar required submittals.
6. Approved substitutions.
7. Reports of inspection and testing agencies.
8. Inspection certificates.
9. Manufacturer's certificates, manufacturer's instructions, and reports of manufacturer's field observations.
10. Samples.
11. Other items indicated in various sections within Division 01.

B. Obtain from Architect and pay reproduction costs for one set of archival quality mylar Contract Drawings for recording changes and modifications.

C. Obtain from Architect and pay reproduction costs for one set of Project Manuals for record purposes.

D. Store record documents and samples in field office apart from documents used for construction. Provide files and racks for secure storage.

E. Label and file documents and samples in accordance with section number listings in Table of Contents of Project Manual. Label each item PROJECT RECORD DOCUMENT in stamped or printed letters in prominent location on each Drawing.

F. Maintain documents and samples in clean, dry, legible condition; do not use for construction purposes.

G. Record information concurrently with construction progress.

H. Make documents available for review by Architect and Owner during construction period.

1.8 CONTRACT DRAWINGS AND SHOP DRAWINGS

A. Legibly mark drawings to record actual construction which varies appreciably from Contract Documents. Give particular attention to information on concealed elements which would be difficult to identify or measure and record later. Items required to be marked include but are not limited to:

1. Dimensional changes to Drawings.
2. Measured depths of foundation below first floor datum.
3. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
4. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of construction.
5. Revisions to routing of piping and conduits.
6. Revisions to electrical circuitry.
7. Actual equipment locations.
8. Duct size and routing.
9. Revisions to details shown on Drawings.
10. Details not on original Contract Drawings.
11. Changes made by addenda, change orders, change directives, supplemental instructions, and other issued modifications.
12. References to related shop drawings and other similar detailed modifications.

B. Mark-up Procedures:

1. Mark completely and accurately record prints of Contract Drawings or shop drawings, whichever is most capable of showing actual physical conditions. Where shop drawings are marked, show cross-reference on Contract Drawings location.
2. Mark record sets with red erasable colored pencil; use other colors to distinguish between changes for different categories of Work at same location.
3. Mark important additional information which was either shown schematically or omitted from original Drawings.
4. Record modifications caused by Supplemental Instructions, Construction Change Directives, Change Orders, Alternates, and similar modifications.
5. Accurately record information using understandable technique.
6. Record data as soon as possible after it has been obtained. In case of concealed installations, record and check mark-up prior to concealment.
7. At time of Substantial Completion, submit Record Drawings to Architect for Owner's records. Organize into sets, bind and label sets for Owner's continued use.

C. Preparation of Reproducibles:

1. Immediately prior to request for Substantial Completion [Final Payment], review completed marked-up Record Drawings with Architect.
2. When authorized, prepare full set of corrected reproducible of Contract Drawings and shop drawings.
3. Incorporate changes and additional information previously marked on print sets. Erase, redraw, and add details and notations where applicable. Identify and date each Record Drawing.

D. Review of Reproducibles:

1. Before copying and distributing, submit corrected reproducibles and original marked-up prints to Architect for review.
2. When acceptable, Architect will initial and date each reproducible, indicating acceptance of general scope of changes and additional information recorded, and of quality of drafting.
3. Reproducibles and original marked-up prints will be returned to Contractor for organizing into sets, printing, binding and final submittal.

E. Copies and Distribution:

1. After completing preparation of reproducible Record Drawings, print 3 copies of each Record Drawing, whether or not changes and additional information were recorded.
2. Organize copies into manageable sets.
3. Bind each set with durable paper cover sheets, with appropriate identification, including titles, dates and other information on cover sheets.
4. Organize and bind original marked-up set of prints that were maintained during construction period in same manner.
5. Organize record reproducibles into sets matching print sets. Place reproducible sets in durable tube-type drawing containers with end caps. Mark end cap of each container with suitable identification.
6. Submit marked-up record set, reproducibles, and prints to Architect for Owner's records; Architect will retain one copy set.

1.9 PROJECT MANUALS

A. Legibly record changes and modifications issued by addenda and change orders.

PART 2 - - PRODUCTS

NOT USED

PART 3 - - EXECUTION

NOT USED

END OF SECTION 017800

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.
3. Salvage of existing items to be reused or recycled.

B. Related Requirements:

1. Section 01 10 00 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Section 01 32 00 "Construction Progress Documentation."
3. Section 01 35 16 "Alteration Project Procedures" for general protection and work procedures for alteration projects.
4. Section 01 73 00 "Execution" for cutting and patching procedures.
5. Section 31 10 00 "Site Clearing" for site clearing and removal of above- and below-grade improvements not part of selective demolition.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.

B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

C. Items to be salvaged by the Owner prior to construction and items to be relocated in relation to project phasing are identified in Part 3.

1.4 PRE-INSTALLATION MEETINGS

A. Pre-demolition Conference: Conduct conference at Project site.

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review structural load limitations of existing structure.
3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
5. Review areas where existing construction is to remain and requires protection.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For refrigerant recovery technician.

B. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.

C. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Use of stairs.
5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

D. Pre-demolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Comply with Section 01 32 00 - Construction Progress Documentation. Submit before Work begins.

1.6 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

1. Before selective demolition, Owner will remove the following items:

a. Items to be confirmed by Owner.
b. All teaching materials, books etc.
c. All tables and chairs
d. Some boxed items will remain within certain rooms as coordinated with the contractor.

2. Items that will remain and will be removed and reinstalled as required by the contractor include all cabinetry and wall mounted boards.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: Present in buildings and structures to be selectively demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.

1. Hazardous material remediation is being performed under separate contract. Coordinate with the Abatement Contractor as required for demolition work and as specified elsewhere in the Contract Documents.
2. Do not disturb hazardous materials or items suspected of containing hazardous materials. Notify the Owner/Architect immediately when such materials are encountered.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.7 COORDINATION

A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

C. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

D. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.

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

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Arrange to shut off utilities with utility companies.
2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.

a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.3 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 50 00 - Temporary Facilities and Controls.

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

1. Strengthen or add new supports when required during progress of selective demolition.

C. Remove temporary barricades and protections where hazards no longer exist.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
5. Maintain fire watch during and for at least 16 hours after flame-cutting operations.
6. Maintain adequate ventilation when using cutting torches.
7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
10. Dispose of demolished items and materials promptly. Comply with requirements in Section 01 74 00 – Cleaning and Waste Management.

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

C. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Transport items to Owner's storage area/on-site areas to be determined.
4. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.

B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.

C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

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

E. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight. See Section 075423 - Thermoplastic Polyolefin (TPO) Roofing for new roofing requirements.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and recycle or dispose of them according to Section 017400 – Cleaning and Waste Management.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
4. Comply with requirements specified in Section 017400 – Cleaning and Waste Management.

B. Burning: Do not burn demolished materials.

3.7 CLEANING

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

3.8 ITEMS TO BE SALVAGED BY THE OWNER

A. The following items are identified as property of the School District per paragraph 1.4.A. All items listed below will be salvaged and removed from the project by the Owner's forces.

1. Refer to Demolition Drawings.

3.9 ITEMS TO BE RELOCATED OR SALVAGED BY THE OWNER AT A FUTURE DATE

A. The following items are identified as property of the School District per paragraph 1.4.A. All items listed below are scheduled to be either: removed and reinstalled, remain to facilitate construction phasing and occupancy, or salvaged and removed by the Owner. The Owner will coordinate with the Contractor to determine the best timing for the handling of the below items.

1. Refer to Demolition Drawings.

3.10 ITEMS TO BE SALVAGED BY THE CONTRACTOR

1. Refer to Demolition Drawings for all items to be salvaged and re-used by the Contractor.

END OF SECTION 024119

SECTION 220000 - GENERAL PROVISIONS FOR PLUMBING WORK

PART 1 GENERAL

1.1 ALTERNATES

A. Take cognizances of any change required in this work, which may be a direct result of any alternate bid item listed and include the price deemed necessary to meet the requirements of the respective alternate.

1.2 BIDDING

A. The Contractor shall provide labor, materials, equipment, items, articles, operations and methods listed, shown, scheduled, or mentioned on the drawings, and/or specified, including all incidentals required for their completion.

B. The Contractor shall refer to the General part of these specifications, such as Instructions to Bidders, Special Conditions and DIVISION 1 for restrictions covering time that work can be performed in certain areas, noisy and dusty operations, sequence of work, access to restricted areas and similar types of work and operations.

1.3 CODES, REGULATIONS AND PERMITS

A. All materials and equipment shall be new, approved by the governing authority, and be in new, undamaged condition when installed.

B. Comply with the International Mechanical Code, National Fire Protection Association Fire Codes, State of Montana Plumbing Code, International Building Code, and all other applicable Federal, State, County and City codes, regulations and ordinances. Comply with DIVISION 26 and all codes referenced therein for any and all electrical work accomplished under this Division or by this Contractor.

C. Arrange for and obtain all permits and approvals required for the execution of the work.

1.4 INTENT OF DRAWINGS

A. Pipe or duct risers and other diagrams are schematic only and not to scale. They are intended only to indicate sizes or relative arrangement of pipe and equipment shown elsewhere in plan view.

B. Plan views of pipes, ducts and equipment are partially diagrammatic. The Contractor shall field verity the exact location of pipes, ducts and equipment

1.5 WORKMANSHIP

A. Work shall be accomplished by workmen skilled in the particular trade, in conformance with best practices and to meet all applicable codes.

B. The Engineer decides where work is satisfactory. This Contractor shall replace materials or equipment not properly installed or finished, without increase in payment received.

1.6 RESPONSIBILITY

A. The Contractor is responsible for installation of a satisfactory and complete piece of work in accordance with true intent of the drawings and specifications.

B. Consult all drawings for the project to predetermine that the work and equipment will fit as planned.

C. The location of piping, ducts, equipment, etc., shall be checked to ensure clearance from openings, structural members, cabinets, lights, outlets, and equipment having fixed locations. This shall be accomplished prior to fabrication of pipe or ducts.

D. If, at any time, and in any case, changes in location of piping, ducts, equipment, etc., becomes necessary due to existing obstacles or installation of other trades shown on any of the project drawings such required changes shall be made by the Contractor at no extra cost. These changes are to be recorded on the record drawings.

E. This Contractor is responsible to provide all incidental electrical interconnections, control wiring, etc., which are necessary for system completion and which are not specifically shown or otherwise indicated on the electrical drawings or specified in DIVISION 26.

F. All electrical work incidental to or accomplished under this Division shall comply with all requirements of DIVISION 26.

1.7 DELIVERY AND STORAGE OF MATERIALS

A. Make provisions which are acceptable to the Owner and Engineer for delivery and storage of materials.

B. Make provisions for introduction into the building of equipment furnished under this DIVISION.

C. Refer to DIVISION 01 for additional provisions to allow equipment passage into the building.

1.8 MANUFACTURER'S DIRECTIONS

A. Manufactured materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer unless noted otherwise herein or on the drawings.

B. Certain items of equipment, as noted herein, shall be checked out, started and put into service by factory representatives.

1.9 CUTTING, PATCHING, REPAIRING

A. Cutting, patching and repairing required by the work of this DIVISION shall be the responsibility of this Contractor.

B. Work shall be performed in accordance with DIVISION 01 of these specifications.

C. The performance of this work shall not weaken the structural integrity of the building.

D. Any abrasion or disfigurement of the finished work or any portion of the building where any such abrasion or disfigurement is caused by the activities of the Contractor shall be repaired and neatly refinished to match the adjacent work.

1.10 OPENINGS IN PIPES AND DUCTS

A. Openings in pipes and ducts shall be kept closed during progress of work.

B. The Contractor is required to clean new systems found dirty to the satisfaction of the Engineer at no additional cost.

1.11 CLEANUP

A. Upon completion of work, remove materials, scraps, etc., relative to this work and leave the premises in a clean and orderly condition. This applies equally to finished, unfinished and concealed spaces.

B. Clean equipment of dirt and debris.

1.12 SAMPLES

A. The Contractor shall submit actual production samples on any material or equipment requested if, in the Engineer's opinion, it is necessary in order to determine the quality, workmanship, operation, etc. of the item.

B. Samples will be returned to the Contractor. Approved samples may be used on the job.

C. Costs incurred in providing and returning samples will be the responsibility of the Contractor.

1.13 TEMPORARY SERVICES

A. See DIVISION 01 - GENERAL REQUIREMENTS for Temporary Facilities.

1.14 FIRE PROTECTION

A. Metallic pipe, duct and other penetrations of all fire partitions, walls and floors shall be effectively fire-stopped to equal the fire rating of the floor or partition using materials and methods UL approved and tested to meet all conditions of ASTME E119, UL 1479 and ASTME 814 tests. One such material is Carborundum bulk "Fiberfrax" fiber packing for filling the annual space between pipe and sleeve or hole and Fiberfrax LDS moldable caulking for sealing in the fiber packing. Other acceptable materials are Dow Corning 3-6548 Silicon RTV foam firestop system, General Electric 'Pensil' 851 system or U.S.G. fire code compound and Thermafire.

B. PVC pipe, duct penetrations to be fire stopped same as metallic penetrations with the addition of an intumescent wrap to effectively close the hole if PVC vaporizes.

C. Construction of permanent bracing, framing, roof curbs and platforms or other structures which utilize wood construction shall be fabricated from fire resistant treated materials or shall be otherwise protected by approved fire resistant materials.

1.15 ACCESS DOORS

A. Where access to valves, dampers, equipment, etc. is required, provide Inryco/Milcor Type "K", "DW", or "M" doors. Access doors required in fire-rated walls or ceilings shall be U.L. approved, similar and equal to Ruskin ArchitectW1. Size of door shall be sufficient to provide proper access to item, if size is not listed on the drawings.

1.16 COMPLETION AND TESTS

A. Complete and test each system as specified. Submit all reports and complete the Project Completion Checklist in PART 3 of this Section. Leave all systems in proper operation.

B. At the time of finalizing the Project, a completion system test shall be performed in the presence of the Owner's designated representative. During the test the contractor shall demonstrate that all systems perform in the manner described in the specifications and indicated on the drawings. Test procedure and the results shall be recorded and delivered to the Owner. Tests shall be repeated after any corrections are made as a result of initial testing of correctional work under guaranteed provisions.

1.17 OPERATING INSTRUCTIONS

A. The Contractor shall provide qualified personnel to instruct the Owner's maintenance personnel in the operation and maintenance of all new systems and equipment. In general, these instructions may be given by the installer of the system. However, some equipment or systems require instruction be given by an authorized agent of the supplier or manufacturer. See the individual Sections of this DIVISION for specific training requirements.

B. Written operation and maintenance instructions, as produced by the manufacturer, shall be provided for all equipment. These instructions shall be bound and submitted as described in this Section.

1.18 REMODELING WORK

A. Wherever existing mechanical systems, plumbing, heating, service lines, piping, ducts, controls, etc., are cut into, removed, or interrupted as a result of the contract work, all such items that serve areas or equipment that remain shall be replaced, rerouted, extended, relocated, etc., as necessary to maintain operation of equipment and services.

B. Downtime shall be held to a minimum. Outages shall be scheduled at a time acceptable to and approved by the Owner. Consult with the Owner in sufficient time for him to make necessary preparations for the outage.

C. Demolition

1. Refer to the drawings for execution of demolition.
2. All flush valves shall remain the property of the Owner. Contractor shall remove the flush valves as clean as possible to prevent damage.
3. All existing equipment and material removed and not scheduled for reinstallation shall remain the property of the Owner and shall be delivered to a designated stockpile area on the site by the Contractor. Materials not wanted by the Owner shall be removed from the site by the Contractor.

D. Asbestos Awareness

1. If suspect asbestos materials are encountered, the contractor shall cease work in that area and inform the owner of his suspicions and will not proceed with work until such time that a determination can be made on how to proceed.

E. Site Investigation

1. The Contractor shall be cognizant that this is a remodeling project and as such, certain items cannot be fully illustrated nor explained without field observation. Before submitting his proposal, the Contractor should examine the site and building as it pertains to this Project and make allowances in his proposal for all conditions that will affect the work indicated in the Project manual and contract documents. This would include hidden and other discovered obstacles such as existing pipes, ducts and equipment not necessarily shown on the project drawings.

F. Building access may be arranged by contacting the Owner.

1.19 RECORD DRAWINGS

A. A separate set of mechanical drawings shall be maintained at the job site at all times and shall be used as record drawings. This set shall be kept up to date with all changes and/or additions in the construction and/or mechanical systems, and shall be delivered to the Engineer at the completion of this job. This set of drawings shall be kept clean and protected at all times.

PART 2 SUBMITTALS AND BROCHURES OF EQUIPMENT

2.1 SUBMITTALS

A. **Submit submittals for review in PDF format, assembled into one PDF document. Separate/incomplete files will be rejected and not reviewed. Paper copies will be rejected and not reviewed.**

1. Scans of material which are not of a permanent or legible nature will not be accepted for shop drawing submittals. Copies must be legible with all dimensions and other pertinent data clear.

2.2 BROCHURES OF EQUIPMENT

A. The Contractor shall prepare and submit complete Brochures of Equipment in PDF portfolio format. Each section shall contain all required submittal data for the construction materials and each piece of equipment (reference Submittal Schedule, 15000 2.03) installed under this project. The literature required for submittal purposes shall be expanded to include operation and maintenance literature for each piece of equipment. Maintenance information shall be complete in every respect and shall include parts lists and assembly drawings wherever applicable. Manuals, catalogs, etc., shall be PDF, as supplied by the factory, and not scanned.

B. All literature shall clearly indicate the equipment it represents and shall be labeled with the equipment identification abbreviation found on the drawings, e.g. EF-1, etc. All information which is applicable to the particular model and size supplied shall be clearly highlighted in the PDF document. This includes dimensional drawings, maintenance information, parts lists, wiring diagrams, etc. Only the information applicable to the particular equipment supplied shall remain and it shall be easy to follow. Documents not meeting these requirements shall be returned for correction.

C. Separate files shall be used to separate the literature for equipment supplied under each of the various Sections of this DIVISION. Divider headings shall read the same as the Section title.

PART 3PROJECT CLOSEOUT

3.1 REFER TO DIVISION 01 SECTION 017700 CLOSEOUT PROCEEDURES.

END OF SECTION

SECTION 220523 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Applications.

B. General requirements.

C. Ball valves.

D. Butterfly valves.

E. Check valves.

F. Gate valves.

G. Globe valves.

H. Plug valves.

1.2 RELATED REQUIREMENTS

A. Section 078400 - Firestopping.

B. Section 083100 - Access Doors and Panels.

C. Section 220548 - Vibration and Seismic Controls for Plumbing Piping and Equipment.

D. Section 220553 - Identification for Plumbing Piping and Equipment.

E. Section 220716 - Plumbing Equipment Insulation.

F. Section 220719 - Plumbing Piping Insulation.

G. Section 221005 - Plumbing Piping.

1.3 REFERENCE STANDARDS

A. API STD 594 - Check Valves: Flanged, Lug Wafer, and Butt-Welding 2017.

B. ASME B1.20.1 - Pipe Threads, General Purpose (Inch) 2013 (Reaffirmed 2018).

C. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250 2015.

D. ASME B16.5 - Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24 Metric/Inch Standard 2017.

E. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings 2018.

F. ASTM A48/A48M - Standard Specification for Gray Iron Castings 2003 (Reapproved 2016).

G. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings 2004 (Reapproved 2019).

H. ASTM A536 - Standard Specification for Ductile Iron Castings 1984 (Reapproved 2014).

I. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings 2017.

J. AWWA C606 - Grooved and Shouldered Joints 2015.

K. MSS SP-67 - Butterfly Valves 2017.

L. MSS SP-70 - Cast Iron Gate Valves, Flanged and Threaded Ends 2011.

M. MSS SP-71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends 2018.

N. MSS SP-72 - Ball Valves with Flanged or Butt-Welding Ends for General Service 2010a.

O. MSS SP-78 - Cast Iron Plug Valves, Flanged and Threaded Ends 2011.

P. MSS SP-80 - Bronze Gate, Globe, Angle and Check Valves 2013.

Q. MSS SP-85 - Cast Iron Globe & Angle Valves, Flanged and Threaded Ends 2011.

R. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends 2010.

S. NSF 61 - Drinking Water System Components - Health Effects 2019.

T. NSF 372 - Drinking Water System Components - Lead Content 2016.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on valves including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.

C. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts listings.

1.5 QUALITY ASSURANCE

A. Manufacturer:

1. Obtain valves for each valve type from single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Use the following precautions during storage:

1. Maintain valve end protection and protect flanges and specialties from dirt.
2. Store valves in shipping containers and maintain in place until installation.
   a. Store valves indoors in dry environment.
   b. Store valves off the ground in watertight enclosures when indoor storage is not an option.

PART 2 PRODUCTS

2.1 APPLICATIONS

A. See Drawings for specific valve locations.

B. Provide the following valves for the applications if not indicated on Drawings:

1. Shutoff: Ball, butterfly, gate
2. Swing Check (Pump Outlet):
   a. 2 NPS and Smaller: Bronze swing check valves with bronze or nonmetallic disc.
   b. 2-1/2 NPS and Larger for Domestic Water: Iron swing check valves with closure control , metal or resilient seat check valves.

C. Substitutions of valves with higher CWP classes or SWP ratings for same valve types are permitted when specified CWP ratings or SWP classes are not available.

D. Required Valve End Connections for Non-Wafer Types:

1. Copper Tube:
   a. 2 NPS and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
   b. 2-1/2 NPS to 4 NPS: Grooved or flanged ends except where threaded valve-end option is indicated in valve schedules below.
   c. 5 NPS and Larger: Grooved or flanged ends.

E. Domestic, Hot and Cold Water Valves:

1. 2 NPS and Smaller:
   a. Bronze and Brass: Provide with solder-joint or threaded ends.
   b. Ball: Two piece, full port, brass or bronze with brass trim.
   c. Bronze Swing Check: Class 125, bronze disc.
   d. Bronze Gate: Class 125, NRS.

e. Bronze Globe: Class 125, bronze disc.

2. 2-1/2 NPS and Larger:
   a. Iron, 2-1/2 NPS to 4 NPS: Provide with threaded or flanged ends.
   b. Iron Ball: Class 150.
   c. Iron Single-Flange Butterfly: 200 CWP, EPDM seat, aluminum-bronze disc.
   d. Iron Grooved-End Butterfly: 175 CWP.
   e. Iron Swing Check: Class 125, metal seats.
   f. Iron Grooved-End Swing Check: 300 CWP.
   g. Iron Gate: Class 125, NRS.
   h. Iron Globe: Class 125.

2.2 GENERAL REQUIREMENTS

A. Valve Pressure and Temperature Ratings: No less than rating indicated; as required for system pressures and temperatures.

B. Valve Sizes: Match upstream piping unless otherwise indicated.

C. Valve Actuator Types:

1. Handwheel: Valves other than quarter-turn types.
2. Hand Lever: Quarter-turn valves 6 NPS and smaller except plug valves.

D. Valves in Insulated Piping: With 2 NPS stem extensions and the following features:

1. Gate Valves: Rising stem.
2. Ball Valves: Extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
3. Butterfly Valves: Extended neck.

E. Valve-End Connections:

1. Threaded End Valves: ASME B1.20.1.
2. Flanges on Iron Valves: ASME B16.1 for flanges on iron valves.
3. Pipe Flanges and Flanged Fittings 1/2 NPS through 24 NPS: ASME B16.5.
4. Solder Joint Connections: ASME B16.18.
5. Grooved End Connections: AWWA C606.

F. General ASME Compliance:

1. Ferrous Valve Dimensions and Design Criteria: ASME B16.10 and ASME B16.34.
2. Solder-joint Connections: ASME B16.18.

G. Valve Materials for Potable Water: NSF 61 and NSF 372.

H. Bronze Valves:

1. Fabricate from dezincification resistant material.
2. Copper alloys containing more than 15 percent zinc are not permitted.

I. Valve Bypass and Drain Connections: MSS SP-45.

J. Source Limitations: Obtain each valve type from a single manufacturer.

2.3 BRASS BALL VALVES

A. Two Piece, Full Port with Brass Trim:

1. Comply with MSS SP-110.
2. SWP Rating: 150 psig.
3. Body: Forged brass.
4. Ends: Threaded or soldered.
5. Seats: PTFE.
6. Stem: Brass.
7. Ball: Chrome-plated brass.

2.4 BRONZE BALL VALVES

A. Two Piece, Full Port with Bronze Trim:

1. Comply with MSS SP-110.
2. SWP Rating: 150 psig.
3. Body: Bronze.
4. Ends: Threaded.
5. Seats: PTFE.
6. Stem: Bronze.
7. Ball: Chrome plated brass.

2.5 IRON BALL VALVES

A. Class 125, Full Port, Stainless Steel Trim:

1. Comply with MSS SP-72.
2. CWP Rating: 200 psig.
3. Body: ASTM A536 Grade 65-45-12, ductile iron.
4. Ends: Flanged.
5. Seats: PTFE.
6. Stem: Stainless steel.
7. Ball: Stainless steel.
8. Operator: Lever, with locking handle.

2.6 IRON, SINGLE FLANGE BUTTERFLY VALVES

A. Lug type: Bi-directional dead-end service without use of downstream flange.

1. Comply with MSS SP-67, Type I.

2. CWP Rating: 200 psig.
3. Body: ASTM A126, cast iron or ASTM A536, ductile iron.
4. Stem: One or two-piece stainless steel.
5. Seat: EPDM.
6. Disc: Coated ductile iron.

2.7 IRON, GROOVED-END BUTTERFLY VALVES

A. CWP Rating: 175 psig (1200 kPa).

1. Comply with MSS SP-67, Type I.
2. Body: Coated ductile iron.
3. Stem: Two-piece stainless steel.
4. Disc: Coated ductile iron.
5. Disc Seal: EPDM.

2.8 BRONZE SWING CHECK VALVES

A. Class 125: CWP Rating: 200 psig (1380 kPa).

1. Comply with MSS SP-80, Type 3.
2. Design: Horizontal flow.
3. Body: Bronze, ASTM B62.
4. Ends: Threaded as indicated.
5. Disc: Bronze.

2.9 IRON SWING CHECK VALVES

A. Class 125:

1. Comply with MSS SP-71, Type I.
2. CWP Rating: 200 psig.
3. Design: Clear or full waterway.
4. Body: ASTM A126, gray iron with bolted bonnet.
5. Ends: Flanged as indicated.
6. Trim: Composition.
7. Seat Ring and Disc Holder: Bronze.
8. Disc: PTFE.
9. Gasket: Asbestos free.

2.10 IRON GROOVED-END SWING CHECK VALVES

A. 300 CWP:

1. CWP Rating: 300 psig.
2. Body: ASTM A536, Grade 65-45-12 ductile iron.
3. Seal: EPDM.

4. Disc: Ductile iron.
5. Coating: Black, non-lead paint.

2.11 BRONZE GATE VALVES

A. Rising Stem (RS):

1. Comply with MSS SP-80, Type I.
2. Class 125: CWP Rating: 200 psig:.
3. Body: ASTM B62, bronze with integral seat and screw-in bonnet.
4. Ends: Threaded or solder joint joint.
5. Stem: Bronze.
6. Disc: Solid wedge; bronze.
7. Packing: Asbestos free.
8. Handwheel: Malleable iron, bronze, or aluminum.

2.12 IRON GATE VALVES

A. OS & Y:

1. Comply with MSS SP-70, Type I.
2. Class 125: CWP Rating: 200 psig:.
3. Body: ASTM A126, gray iron with bolted bonnet.
4. Ends: Flanged.
5. Trim: Bronze.
6. Disc: Solid wedge.
7. Packing and Gasket: Asbestos free.

2.13 BRONZE GLOBE VALVES

A. Class 125: CWP Rating: 200 psig:.

1. Comply with MSS SP-80, Type 1.
2. Body: ASTM B62, bronze with integral seat and screw-in bonnet.
3. Ends: Threaded joint.
4. Stem: Bronze.
5. Disc: PTFE.
6. Packing: Asbestos free.
7. Handwheel: Malleable Iron.

2.14 IRON GLOBE VALVES

A. Class 125: CWP Rating: 200 psig:.

1. Comply with MSS SP-85, Type I.
2. Body: Gray iron; ASTM A126, with bolted bonnet.
3. Ends: Flanged.

4. Trim: Bronze.
5. Packing and Gasket: Asbestos free.
6. Operator: Handwheel or chainwheel.

2.15 LUBRICATED PLUG VALVES

A. Regular Gland with Flanged Ends:

1. Comply with MSS SP-78, Type II.
2. Class 125: CWP Rating: 200 psig.
3. Body: ASTM A48/A48M or ASTM A126, cast iron with lubrication sealing system.
4. Pattern: Regular or short.
5. Plug: Cast iron or bronze with sealant groove.

PART 3 EXECUTION

3.1 EXAMINATION

A. Discard all packing materials and verify that valve interior, including threads and flanges are completely clean without signs of damage or degradation that could result in leakage.

B. Verify valve parts to be fully operational in all positions from closed to fully open.

C. Confirm gasket material to be suitable for the service, to be of correct size, and without defects that could compromise effectiveness.

D. If valve is determined to be defective, replace with new valve.

3.2 INSTALLATION

A. Provide unions or flanges with valves to facilitate equipment removal and maintenance while maintaining system operation and full accessibility for servicing.

B. Provide separate valve support as required and locate valve with stem at or above center of piping, maintaining unimpeded stem movement.

C. Install check valves where necessary to maintain direction of flow as follows:

1. Swing Check: Install horizontal maintaining hinge pin level.

END OF SECTION

SECTION 220553 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Nameplates.

B. Tags.

C. Pipe markers.

D. Ceiling tacks.

1.2 REFERENCE STANDARDS

A. ASME A13.1 - Scheme for the Identification of Piping Systems 2015.

B. ASME A13.1 - Scheme for the Identification of Piping Systems; The American Society of Mechanical Engineers; 2007 (ANSI/ASME A13.1).

C. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2013.

1.3 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

PART 2 PRODUCTS

2.1 IDENTIFICATION APPLICATIONS

A. Piping: Pipe markers.

B. Pumps: Nameplates.

C. Tanks: Nameplates.

D. Valves: Tags and ceiling tacks where located above lay-in ceiling.

E. Water Treatment Devices: Nameplates.

2.2 NAMEPLATES

A. Manufacturers:

1. Brimar Industries, Inc.: www.pipemarker.com.
2. Kolbi Pipe Marker Co.: www.kolbipipemarkers.com.
3. Seton Identification Products: www.seton.com.
4. Substitutions: See Section 016000 - Product Requirements.

B. Description: Laminated three-layer plastic with engraved letters.

1. Letter Color: White.
2. Letter Height: 1/4 inch.
3. Background Color: Black.
4. Plastic: Conform to ASTM D709.

2.3 TAGS

A. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch diameter.

2.4 PIPE MARKERS

A. Comply with ASME A13.1.

B. Plastic Pipe Markers: Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.

C. Color code as follows:

1. Potable, Cooling, Boiler, Feed, Other Water: Green with white letters.
2. Fire Quenching Fluids: Red with white letters.

2.5 CEILING TACKS

A. Description: Steel with 3/4 inch diameter color coded head.

B. Color code as follows:

1. HVAC Equipment: Yellow.
2. Fire Dampers and Smoke Dampers: Red.
3. Plumbing Valves: Green.
4. Heating/Cooling Valves: Blue.

PART 3 EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

A. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

B. Install tags with corrosion resistant chain.

C. Install plastic pipe markers in accordance with manufacturer's instructions.

D. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

E. Install underground plastic pipe markers 6 to 8 inches below finished grade, directly above buried pipe.

F. Use tags on piping 3/4 inch diameter and smaller.

1. Identify service, flow direction, and pressure.
2. Install in clear view and align with axis of piping.
3. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

G. Locate ceiling tacks to locate valves or dampers above lay-in panel ceilings. Locate in corner of panel closest to equipment.

END OF SECTION

SECTION 220719 - PLUMBING PIPING INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Piping insulation.

B. Jackets and accessories.

1.2 RELATED REQUIREMENTS

A. Section 078400 - Firestopping.

B. Section 221005 - Plumbing Piping: Placement of hangers and hanger inserts.

C. Section 22 1006 - Plumbing Piping: Placement of hangers and hanger inserts.

1.3 REFERENCE STANDARDS

A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus 2019.

B. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement 2007 (Reapproved 2013).

C. ASTM C449 - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement 2007 (Reapproved 2013).

D. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus 2017.

E. ASTM C533 - Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation 2017.

F. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation 2019.

G. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel 2008 (Reapproved 2018).

H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.

I. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.

J. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified in this section and approved by manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.7 FIELD CONDITIONS

A. Maintain ambient conditions required by manufacturers of each product.

B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84, UL 723, ASTM E84, or UL 723.

2.2 GLASS FIBER

A. Manufacturers:

1. CertainTeed Corporation: www.certainteed.com.
2. Johns Manville Corporation: www.jm.com.
3. Knauf Insulation: www.knaufusa.com.

4. Owens Corning Corporation; Fiberglas Pipe Insulation ASJ: www.ocbuildingspec.com/#sle.
5. Substitutions: See Section 016000 - Product Requirements.

B. Insulation: ASTM C547and ASTM C795; semi-rigid, noncombustible, end grain adhered to jacket.

1. 'K' Value: ASTM C177, 0.24 at 75 degrees F.
2. Maximum Service Temperature: 650 degrees F.
3. Maximum Moisture Absorption: 0.2 percent by volume.

C. Vapor Barrier Jacket: White Kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.

D. Vapor Barrier Lap Adhesive: Compatible with insulation.

E. Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.

F. Fibrous Glass Fabric:

1. Cloth: Untreated; 9 oz/sq yd weight.
2. Blanket: 1.0 lb/cu ft density.
3. Weave: 5 by 5.

G. Indoor Vapor Barrier Finish:

1. Cloth: Untreated; 9 oz/sq yd weight.
2. Vinyl emulsion type acrylic, compatible with insulation, black color.

2.3 HYDROUS CALCIUM SILICATE

A. Manufacturers:

1. Johns Manville Corporation: www.jm.com.
2. Substitutions: See Section 016000 - Product Requirements.

B. Insulation: ASTM C533 and ASTM C795; rigid molded, asbestos free, gold color.

1. 'K' Value: 0.40 at 300 degrees F when tested in accordance with ASTM C177 or ASTM C518.
2. Maximum Service Temperature: 1200 degrees F.
3. Density: 15 lb/cu ft.

C. Insulating Cement: ASTM C449.

2.4 JACKETS

A. PVC Plastic.

1. Manufacturers:
   a. Johns Manville Corporation: www.jm.com.
   b. Substitutions: See Section 016000 - Product Requirements.
2. Jacket: One piece molded type fitting covers and sheet material, off-white color.
   a. Minimum Service Temperature: 0 degrees F.
   b. Maximum Service Temperature: 150 degrees F.
   c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.
   d. Thickness: 10 mil.
   e. Connections: Brush on welding adhesive.
3. Covering Adhesive Mastic: Compatible with insulation.

B. ABS Plastic:

1. Jacket: One piece molded type fitting covers and sheet material, off-white color.
   a. Minimum Service Temperature: Minus 40 degrees F.
   b. Maximum Service Temperature: 180 degrees F.
   c. Moisture Vapor Permeability: 0.012 perm inch, when tested in accordance with ASTM E96/E96M.
   d. Thickness: 30 mil.
   e. Connections: Brush on welding adhesive.

C. Canvas Jacket: UL listed 6 oz/sq yd plain weave cotton fabric treated with dilute fire retardant lagging adhesive.

1. Lagging Adhesive: Compatible with insulation.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that piping has been tested before applying insulation materials.

B. Verify that surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with North American Insulation Manufacturers Association (NAIMA) National Insulation Standards.

C. Exposed Piping: Locate insulation and cover seams in least visible locations.

D. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.

E. Glass fiber insulated pipes conveying fluids below ambient temperature:

1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.

F. For hot piping conveying fluids over 90 degrees F, insulate flanges and unions at equipment.

G. Glass fiber insulated pipes conveying fluids above ambient temperature:

1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples.
2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.

H. Inserts and Shields:

1. Application: Piping 1-1/2 inches diameter or larger.
2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
3. Insert Location: Between support shield and piping and under the finish jacket.
4. Insert Configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
5. Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.

I. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, refer to Section 078400.

J. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet above finished floor): Finish with PVC jacket and fitting covers.

K. Heat Traced Piping: Insulate fittings, joints, and valves with insulation of like material, thickness, and finish as adjoining pipe. Size large enough to enclose pipe and heat tracer. Cover with aluminum jacket with seams located on bottom side of horizontal piping.

3.3 SCHEDULES

A. Plumbing Systems:

1. Domestic Hot and Cold Water:
   a. Glass Fiber Insulation:
      1) Copper Piping.
      2) Pipe Size Range: 1/2" - 2" inch.
      3) Thickness: 1" inch.
2. Domestic Hot Water Recirculation:
   a. Glass Fiber Insulation:

1) Pipe Size Range: All sizes.
2) Thickness: 1 inch.

3. Roof Drain Bodies:
4. Roof Drainage Above Grade:

B. Other Systems:

1. Piping Exposed to Freezing with Heat Tracing:

END OF SECTION

SECTION 221005 - PLUMBING PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Pipe, pipe fittings, specialties, and connections for piping systems.

1. Sanitary sewer.
2. Domestic water.
3. Storm water.
4. Gas.
5. Flanges, unions, and couplings.
6. Pipe hangers and supports.
7. Valves.
8. Flow controls.
9. Check.
10. Relief valves.

1.2 RELATED REQUIREMENTS

A. Section 078413 - Penetration Firestopping

B. Section 220516 - Expansion Fittings and Loops for Plumbing Piping.

C. Section 220553 - Identification for Plumbing Piping and Equipment.

D. Section 220719 - Plumbing Piping Insulation.

1.3 REFERENCE STANDARDS

A. ANSI Z21.22 - American National Standard for Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems 2015.

B. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300 2016.

C. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings 2018.

D. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings 2018.

E. ASME B31.1 - Power Piping 2018.

F. ASME B31.9 - Building Services Piping 2017.

G. ASME BPVC-IV - Boiler and Pressure Vessel Code, Section IV - Rules for Construction of Heating Boilers 2019.

H. ASME BPVC-IX - Qualification Standard for Welding, Brazing, and Fuzing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators - Welding Brazing and Fusing Qualifications 2019.

I. ASSE 1003 - Performance Requirements for Water Pressure Reducing Valves for Domestic Water Distribution Systems 2009.

J. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings 1999, with Editorial Revision (2018).

K. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2018.

L. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.

M. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service 2019.

N. ASTM B88 - Standard Specification for Seamless Copper Water Tube 2020.

O. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric) 2020.

P. ASTM B813 - Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube 2016.

Q. ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings 2016.

R. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems 2012 (Reapproved 2018).

S. ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings 2014.

T. ASTM D2855 - Standard Practice for the Two-Step (Primer & Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets 2015.

U. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings 2016.

V. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe 2014.

W. ASTM F679 - Standard Specification for Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings 2016.

X. ASTM F876 - Standard Specification for Crosslinked Polyethylene (PEX) Tubing 2019a.

Y. ASTM F877 - Standard Specification for Crosslinked Polyethylene (PEX) Hot- and Cold-Water Distribution Systems 2020.

Z. AWWA C606 - Grooved and Shouldered Joints 2015.

AA. AWWA C651 - Disinfecting Water Mains 2014.

BB. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications 2017 (Revised 2018).

CC. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications 2012 (Revised 2018).

DD. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements 2015.

EE. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry Elements 2015.

FF. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements 2015.

GG. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements 2016.

HH. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation 2018.

II. MSS SP-67 - Butterfly Valves 2017.

JJ. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends 2010.

KK. NSF 61 - Drinking Water System Components - Health Effects 2019.

LL. NSF 372 - Drinking Water System Components - Lead Content 2016.

MM. PPI TR-4 - PPI Listing of Hydrostatic Design Basis (HDB), Hydrostatic Design Stress (HDS), Strength Design Basis (SDB), Pressure Design Basis (PDB), and Minimum Required Strength (MRS) Ratings For Thermoplastic Piping Materials or Pipe 2017.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

C. Welder Certificate: Include welders certification of compliance with ASME BPVC-IX.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with applicable codes.

B. Valves: Manufacturer's name and pressure rating marked on valve body.

C. Welding Materials and Procedures: Conform to ASME BPVC-IX and applicable state labor regulations.

D. Welder Qualifications: Certified in accordance with ASME BPVC-IX.

E. Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.7 FIELD CONDITIONS

A. Do not install underground piping when bedding is wet or frozen.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

2.2 SANITARY SEWER PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. PVC Pipe: ASTM D2665, ASTM D3034, or ASTM F679.

1. Fittings: PVC.
2. Joints: Push-on, using ASTM F477 elastomeric gaskets.

2.3 SANITARY SEWER AND VENT PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, hubless, service weight.

1. Fittings: Cast iron.
2. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.

2.4 DOMESTIC WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Cross-Linked Polyethylene (PEX) Pipe: ASTM F876 or ASTM F877.

1. Manufacturers:
   a. Uponor, Inc.: www.uponorpro.com.
2. PPI TR-4 Pressure Design Basis:
   a. 100 psig at maximum 180 degrees F.
3. Fittings: PEX.

2.5 DOMESTIC WATER PIPING, ABOVE GRADE

A. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), Drawn (H).

1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
2. Joints: Grooved mechanical couplings.
   a. Mechanical Couplings: 2"-8" for copper tubing consisting of ductile iron cast housings, complete with a synthetic rubber gasket of a pressure-responsive design, with plated nuts and bolts to secure unit together. Couplings shall be manufactured to connect copper tubing sized tube and fittings. (Flaring of tube and fitting ends to IPS dimensions is not allowed.)
   b. Coupling Housings: Ductile iron conforming to ASTM A-536, Grade 65-45-12, coated with copper colored alkyd enamel. Housings cast with offsetting, angle-pattern bolt pads to provide rigidity.
   c. Coupling Gaskets: Gasket shall be Grade EPDM compound designed for operating temperatures from -30 deg F to +250 deg F. Gasket shall meet the stated temperature range without the use of specialized or high heat lubricants.
      1) Reference shall always be made to the latest published grooved manufacturer’s gasket selection guide for proper gasket selection for the intended service.

B. Cross-Linked Polyethylene (PEX) Pipe: ASTM F876 or ASTM F877.

1. Manufacturers:
   a. Uponor, Inc.: www.uponorpro.com.
   b. Zurn Industries, LLC: www.zurn.com.
2. PPI TR-4 Pressure Design Basis:
   a. 100 psig at maximum 180 degrees F.
3. Fittings: PEX.

2.6 STORM WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. PVC Pipe: ASTM D2665 or ASTM D3034.

1. Fittings: PVC.
2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.7 STORM WATER PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, hubless, service weight.

1. Fittings: Cast iron.
2. Joints: Neoprene gaskets and stainless steel clamp-and-shield assemblies.

2.8 NATURAL GAS PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A53/A53M Schedule 40 black.

1. Fittings: ASME B16.3, malleable iron, or ASTM A234/A234M, wrought steel welding type.
2. Joints: Threaded or welded to ASME B31.1.

2.9 FLANGES, UNIONS, AND COUPLINGS

A. Unions for Pipe Sizes 3 Inches and Under:

1. Copper tube and pipe: Class 150 bronze unions with soldered joints.

B. Mechanical Couplings for Grooved and Shouldered Joints: Two or more curved housing segments with continuous key to engage pipe groove, circular C-profile gasket, and bolts to secure and compress gasket.

1. Dimensions and Testing: In accordance with AWWA C606.
2. Housing Material: Provide ASTM A47/A47M malleable iron or ductile iron.
3. Gasket Material: EPDM suitable for operating temperature range from minus 30 degrees F to 230 degrees F.
4. Bolts and Nuts: Hot dipped galvanized or zinc-electroplated steel.
5. When pipe is field grooved, provide coupling manufacturer's grooving tools.

C. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.10 PIPE HANGERS AND SUPPORTS

A. Provide hangers and supports that comply with MSS SP-58.

1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
3. Trapeze Hangers: Welded steel channel frames attached to structure.
4. Vertical Pipe Support: Steel riser clamp.
5. Rooftop Supports for Low-Slope Roofs: Steel pedestals with bases that rest on top of roofing membrane, not requiring any attachment to the roof structure and not penetrating the roofing assembly, with support fixtures as specified; and as follows:
   a. Bases: High density polypropylene.
   b. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
   c. Steel Components: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.
   d. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports; corrosion resistant material.
   e. Height: Provide minimum clearance of 6 inches under pipe to top of roofing.

B. Plumbing Piping - Drain, Waste, and Vent:

1. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.
2. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
3. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
4. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
5. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

C. Plumbing Piping - Water:

1. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.
2. Hangers for Cold Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
3. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
4. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
5. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

D. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:

1. Concrete Wedge Expansion Anchors: Complying with ICC-ES AC193.
2. Masonry Wedge Expansion Anchors: Complying with ICC-ES AC01.
3. Concrete Screw Type Anchors: Complying with ICC-ES AC193.
4. Masonry Screw Type Anchors: Complying with ICC-ES AC106.
5. Concrete Adhesive Type Anchors: Complying with ICC-ES AC308.

2.11 BALL VALVES

A. Construction, 4 Inches and Smaller: MSS SP-110, Class 150, 400 psi CWP, bronze body, 304 stainless steel or chrome plated brass ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, solder or threaded ends with union.

2.12 BUTTERFLY VALVES

A. Manufacturers:

1. Crane Company: www.cranecpe.com.
2. Grinnell Products, a Tyco Business; B302: www.grinnell.com/#sle.
3. Hammond Valve: www.hammondvalve.com.
4. Substitutions: See Section 016000 - Product Requirements.

B. Construction 1-1/2 Inches and Larger: MSS SP-67, 200 psi CWP, cast or ductile iron body, nickel-plated ductile iron disc, resilient replaceable EPDM seat, wafer ends, extended neck, 10 position lever handle.

C. Grooved-End Copper Butterfly Valves: 2-1/2" – 4”, 300 psi maximum pressure rating, with copper tubing sized grooved ends. Cast brass body to UNS C87850. (Alloy code shall be cast or stamped into the valve body.) Aluminum bronze disc to UNS C95500, with pressure responsive elastomer seat. Stem shall be offset from the disc centerline to provide complete 360-degree circumferential seating. Bubble tight, dead-end or bi-directional service, with memory stop for throttling, metering or balancing service. Valve may be automated with electric, pneumatic, or hydraulic operators. Certified to the low lead requirements of NSF-372.

D. Provide gear operators for valves 8 inches and larger, and chain-wheel operators for valves mounted over 8 feet above floor.

2.13 FLOW CONTROLS

A. Manufacturers:

1. Griswold Controls: www.griswoldcontrols.com.
2. ITT Bell & Gossett: www.bellgossett.com.
3. Taco, Inc: www.taco-hvac.com.
4. Substitutions: See Section 016000 - Product Requirements.

B. Construction: Class 125, Brass or bronze body with union on inlet and outlet, temperature and pressure test plug on inlet and outlet, blowdown/backflush drain.

C. Calibration: Control flow within five percent of selected rating, over operating pressure range of ten times minimum pressure required for control, maximum minimum pressure 3.5 psi.

2.14 SPRING LOADED CHECK VALVES

A. Manufacturers:

1. Crane Co.: www.cranecpe.com.
2. Hammond Valve: www.hammondvalve.com.
3. Milwaukee Valve Company: www.milwaukeevalve.com.
4. Substitutions: See Section 016000 - Product Requirements.

B. Class 125, iron body, bronze trim, stainless steel springs, bronze disc, Buna N seals, wafer style ends.

2.15 WATER PRESSURE REDUCING VALVES:

A. Manufacturers:

1. Amtrol Inc: www.amtrol.com.
2. Cla-Val Co: www.cla-val.com.
3. Watts Regulator Company: www.wattsregulator.com.
4. Substitutions: See Section 016000 - Product Requirements.

B. Up to 2 Inches:

1. ASSE 1003, bronze body, stainless steel, and thermoplastic internal parts, fabric reinforced diaphragm, strainer, threaded single union ends.

2.16 RELIEF VALVES

A. Pressure Relief:

1. {\rs\#1} certified, bronze body, teflon seat, steel stem and springs, automatic, direct pressure actuated.

B. Temperature and Pressure Relief:

1. {\rs\#2} certified, bronze body, teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, temperature relief maximum 210 degrees F, capacity {\rs\#1} certified and labelled.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

D. Install piping to maintain headroom, conserve space, and not interfere with use of space.

E. Group piping whenever practical at common elevations.

F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Refer to Section 220516.

G. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

H. Provide access where valves and fittings are not exposed.

I. Install vent piping penetrating roofed areas to maintain integrity of roof assembly[_____].

J. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

K. Install valves with stems upright or horizontal, not inverted. Refer to Section 220523.

L. Pipe vents from gas pressure reducing valves to outdoors and terminate in weather proof hood.

M. Copper Pipe and Tube: Make soldered joints in accordance with ASTM B828, using specified solder, and flux meeting ASTM B813; in potable water systems use flux also complying with NSF 61 and NSF 372.

N. PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.

O. Sleeve pipes passing through partitions, walls and floors.

P. Inserts:

1. Provide inserts for placement in concrete formwork.
2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.

Q. Pipe Hangers and Supports:

1. Install in accordance with ASME B31.9.

2. Support horizontal piping as scheduled.
3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
4. Place hangers within 12 inches of each horizontal elbow.
5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
6. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
7. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

3.4 APPLICATION

A. Install unions downstream of valves and at equipment or apparatus connections.

B. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

C. Install globe valves for throttling, bypass, or manual flow control services.

D. Provide spring loaded check valves on discharge of water pumps.

E. Provide plug valves in natural gas systems for shut-off service.

F. Provide flow controls in water recirculating systems where indicated.

G. Install isolation valves at each bathroom group.

3.5 TOLERANCES

A. Drainage Piping: Establish invert elevations within 1/2 inch vertically of location indicated and slope to drain at minimum of 1/4 inch per foot slope.

B. Water Piping: Slope at minimum of 1/32 inch per foot and arrange to drain at low points.

3.6 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Prior to starting work, verify system is complete, flushed and clean.

B. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.

C. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.

D. Maintain disinfectant in system for 24 hours.

E. If final disinfectant residual tests less than 25 mg/L, repeat treatment.

F. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.

G. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

3.7 SCHEDULES

A. Pipe Hanger Spacing:

1. Metal Piping:
   a. Pipe Size: 1/2 inches to 1-1/4 inches:
      1) Maximum Hanger Spacing: 6.5 ft.
      2) Hanger Rod Diameter: 3/8 inches.
   b. Pipe Size: 1-1/2 inches to 2 inches:
      1) Maximum Hanger Spacing: 10 ft.
      2) Hanger Rod Diameter: 3/8 inch.
   c. Pipe Size: 2-1/2 inches to 3 inches:
      1) Maximum Hanger Spacing: 10 ft.
      2) Hanger Rod Diameter: 1/2 inch.
   d. Pipe Size: 4 inches to 6 inches:
      1) Maximum Hanger Spacing: 10 ft.
      2) Hanger Rod Diameter: 5/8 inch.
2. Plastic Piping:
   a. All Sizes:
      1) Maximum Hanger Spacing: 6 ft.
      2) Hanger Rod Diameter: 3/8 inch.

END OF SECTION

SECTION 230000 - GENERAL PROVISIONS FOR MECHANICAL WORK

PART 1 GENERAL

1.1 ALTERNATES

A. Take cognizances of any change required in this work, which may be a direct result of any alternate bid item listed and include the price deemed necessary to meet the requirements of the respective alternate.

1.2 BIDDING

A. The Contractor shall provide labor, materials, equipment, items, articles, operations and methods listed, shown, scheduled, or mentioned on the drawings, and/or specified, including all incidentals required for their completion.

B. The Contractor shall refer to the General part of these specifications, such as Instructions to Bidders, Special Conditions and DIVISION 01 for restrictions covering time that work can be performed in certain areas, noisy and dusty operations, sequence of work, access to restricted areas and similar types of work and operations.

1.3 CODES, REGULATIONS AND PERMITS

A. All materials and equipment shall be new, approved by the governing authority, and be in new, undamaged condition when installed.

B. Comply with the International Mechanical Code, National Fire Protection Association Fire Codes, State of Montana Plumbing Code, International Building Code, and all other applicable Federal, State, County and City codes, regulations and ordinances. Comply with DIVISION 26 and all codes referenced therein for any and all electrical work accomplished under this Division or by this Contractor.

C. Arrange for and obtain all permits and approvals required for the execution of the work.

1.4 INTENT OF DRAWINGS

A. Pipe or duct risers and other diagrams are schematic only and not to scale. They are intended only to indicate sizes or relative arrangement of pipe and equipment shown elsewhere in plan view.

B. Plan views of pipes, ducts and equipment are partially diagrammatic. The Contractor shall field verity the exact location of pipes, ducts and equipment.

1.5 WORKMANSHIP

A. Work shall be accomplished by workmen skilled in the particular trade, in conformance with best practices and to meet all applicable codes.

B. The Engineer decides where work is satisfactory. This Contractor shall replace materials or equipment not properly installed or finished, without increase in payment received.

1.6 RESPONSIBILITY

A. The Contractor is responsible for installation of a satisfactory and complete piece of work in accordance with true intent of the drawings and specifications.

B. Consult all drawings for the project to predetermine that the work and equipment will fit as planned.

C. The location of piping, ducts, equipment, etc., shall be checked to ensure clearance from openings, structural members, cabinets, lights, outlets, and equipment having fixed locations. This shall be accomplished prior to fabrication of pipe or ducts.

D. If, at any time, and in any case, changes in location of piping, ducts, equipment, etc., becomes necessary due to existing obstacles or installation of other trades shown on any of the project drawings such required changes shall be made by the Contractor at no extra cost. These changes are to be recorded on the record drawings.

E. This Contractor is responsible to provide all incidental electrical interconnections, control wiring, etc., which are necessary for system completion and which are not specifically shown or otherwise indicated on the electrical drawings or specified in DIVISION 26.

F. All electrical work incidental to or accomplished under this Division shall comply with all requirements of DIVISION 26.

1.7 DELIVERY AND STORAGE OF MATERIALS

A. Make provisions which are acceptable to the Owner and Engineer for delivery and storage of materials.

B. Make provisions for introduction into the building of equipment furnished under this DIVISION.

C. Refer to DIVISION 01 for additional provisions to allow equipment passage into the building.

1.8 MANUFACTURER'S DIRECTIONS

A. Manufactured materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer unless noted otherwise herein or on the drawings.

B. Certain items of equipment, as noted herein, shall be checked out, started and put into service by factory representatives.

1.9 CUTTING, PATCHING, REPAIRING

A. Cutting, patching and repairing required by the work of this DIVISION shall be the responsibility of this Contractor.

B. Work shall be performed in accordance with DIVISION 01 of these specifications.

C. The performance of this work shall not weaken the structural integrity of the building.

D. Any abrasion or disfigurement of the finished work or any portion of the building where any such abrasion or disfigurement is caused by the activities of the Contractor shall be repaired and neatly refinished to match the adjacent work.

1.10 OPENINGS IN PIPES AND DUCTS

A. Openings in pipes and ducts shall be kept closed during progress of work.

B. The Contractor is required to clean new systems found dirty to the satisfaction of the Engineer at no additional cost.

1.11 CLEANUP

A. Upon completion of work, remove materials, scraps, etc., relative to this work and leave the premises in a clean and orderly condition. This applies equally to finished, unfinished and concealed spaces.

B. Clean equipment of dirt and debris.

1.12 SAMPLES

A. The Contractor shall submit actual production samples on any material or equipment requested if, in the Engineer's opinion, it is necessary in order to determine the quality, workmanship, operation, etc. of the item.

B. Samples will be returned to the Contractor. Approved samples may be used on the job.

C. Costs incurred in providing and returning samples will be the responsibility of the Contractor.

1.13 TEMPORARY SERVICES

A. See DIVISION 01 - GENERAL REQUIREMENTS for Temporary Facilities.

1.14 FIRE PROTECTION

A. Metallic pipe, duct and other penetrations of all fire partitions, walls and floors shall be effectively fire-stopped to equal the fire rating of the floor or partition using materials and methods UL approved and tested to meet all conditions of ASTME E119, UL 1479 and ASTME 814 tests. One such material is Carborundum bulk "Fiberfrax" fiber packing for filling the annual space between pipe and sleeve or hole and Fiberfrax LDS moldable caulking for sealing in the fiber packing. Other acceptable materials are Dow Corning 3-6548 Silicon RTV foam firestop system, General Electric 'Pensil' 851 system or U.S.G. fire code compound and Thermafire.

B. PVC pipe, duct penetrations to be fire stopped same as metallic penetrations with the addition of an intumescent wrap to effectively close the hole if PVC vaporizes.

C. Construction of permanent bracing, framing, roof curbs and platforms or other structures which utilize wood construction shall be fabricated from fire resistant treated materials or shall be otherwise protected by approved fire resistant materials.

1.15 ACCESS DOORS

A. Where access to valves, dampers, equipment, etc. is required, provide Inryco/Milcor Type "K", "DW", or "M" doors. Access doors required in fire-rated walls or ceilings shall be U.L. approved, similar and equal to Ruskin ArchitectW1. Size of door shall be sufficient to provide proper access to item, if size is not listed on the drawings.

1.16 COMPLETION AND TESTS

A. Complete and test each system as specified. Leave all systems in proper operation.

B. At the time of finalizing the Project, a completion system test shall be performed in the presence of the Owner's designated representative. During the test the contractor shall demonstrate that all systems perform in the manner described in the specifications and indicated on the drawings. Test procedure and the results shall be recorded and delivered to the Owner. Tests shall be repeated after any corrections are made as a result of initial testing of correctional work under guaranteed provisions.

1.17 OPERATING INSTRUCTIONS

A. The Contractor shall provide qualified personnel to instruct the Owner's maintenance personnel in the operation and maintenance of all new systems and equipment. In general, these instructions may be given by the installer of the system. However, some equipment or systems require instruction be given by an authorized agent of the supplier or manufacturer. See the individual Sections of this DIVISION for specific training requirements.

B. Written operation and maintenance instructions, as produced by the manufacturer, shall be provided for all equipment. These instructions shall be bound and submitted as described in this Section.

1.18 REMODELING WORK

A. Wherever existing mechanical systems, plumbing, heating, service lines, piping, ducts, controls, etc., are cut into, removed, or interrupted as a result of the contract work, all such items that serve areas or equipment that remain shall be replaced, rerouted, extended, relocated, etc., as necessary to maintain operation of equipment and services.

B. Downtime shall be held to a minimum. Outages shall be scheduled at a time acceptable to and approved by the Owner. Consult with the Owner in sufficient time for him to make necessary preparations for the outage.

C. Demolition

1. Refer to the drawings for execution of demolition.
2. All existing equipment and material removed and not scheduled for reinstallation shall remain the property of the Owner and shall be delivered to a designated stockpile area on the site by the Contractor. Materials not wanted by the Owner shall be removed from the site by the Contractor.

D. Asbestos Awareness

1. If suspect asbestos materials are encountered, the contractor shall cease work in that area and inform the owner of his suspicions and will not proceed with work until such time that a determination can be made on how to proceed.

E. Site Investigation

1. The Contractor shall be cognizant that this is a remodeling project and as such, certain items cannot be fully illustrated nor explained without field observation. Before submitting his proposal, the Contractor should examine the site and building as it pertains to this Project and make allowances in his proposal for all conditions that will affect the work indicated in the Project manual and contract documents. This would include hidden and other discovered obstacles such as existing pipes, ducts and equipment not necessarily shown on the project drawings.

F. Building access may be arranged by contacting the Owner.

1.19 RECORD DRAWINGS

A. A separate set of mechanical drawings shall be maintained at the job site at all times and shall be used as record drawings. This set shall be kept up to date with all changes and/or additions in the construction and/or mechanical systems, and shall be delivered to the Engineer at the completion of this job. This set of drawings shall be kept clean and protected at all times.

PART 2 SUBMITTALS AND BROCHURES OF EQUIPMENT

2.1 SUBMITTALS

A. **Submit submittals for review in PDF format, assembled into one PDF document. Separate/incomplete files will be rejected and not reviewed. Paper copies will be rejected and not reviewed.**

1. Scans of material which are not of a permanent or legible nature will not be accepted for shop drawing submittals. Copies must be legible with all dimensions and other pertinent data clear.

2.2 BROCHURES OF EQUIPMENT

A. The Contractor shall prepare and submit complete Brochures of Equipment in PDF portfolio format. Each section shall contain all required submittal data for the construction materials and each piece of equipment (reference Submittal Schedule, 15000 2.03) installed under this project. The literature required for submittal purposes shall be expanded to include operation and maintenance literature for each piece of equipment. Maintenance information shall be complete in every respect and shall include parts lists and assembly drawings wherever applicable. Manuals, catalogs, etc., shall be PDF, as supplied by the factory, and not scanned.

B. All literature shall clearly indicate the equipment it represents and shall be labeled with the equipment identification abbreviation found on the drawings, e.g. EF-1, etc. All information which is applicable to the particular model and size supplied shall be clearly highlighted in the PDF document. This includes dimensional drawings, maintenance information, parts lists, wiring diagrams, etc. Only the information applicable to the particular equipment supplied shall remain and it shall be easy to follow. Documents not meeting these requirements shall be returned for correction.

C. Separate files shall be used to separate the literature for equipment supplied under each of the various Sections of this DIVISION. Divider headings shall read the same as the Section title e.g. "15670 WATER CHILLERS."

PART 3 PROJECT CLOSEOUT

3.1 REFER TO DIVISION 01 7700 CLOSEOUT PROCEEDURES.

END OF SECTION

SECTION 230513 - COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. General construction and requirements.

B. Applications.

C. Single phase electric motors.

D. Three phase electric motors.

1.2 RELATED REQUIREMENTS

A. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections.

1.3 REFERENCE STANDARDS

A. NEMA MG 1 - Motors and Generators 2018.

B. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

1.5 QUALITY ASSURANCE

A. Conform to NFPA 70.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect motors stored on site from weather and moisture by maintaining factory covers and suitable weather-proof covering. For extended outdoor storage, remove motors from equipment and store separately.

1.7 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Lincoln Motors: www.lincolnmotors.com.

B. A. O. Smith Electrical Products Company: www.aosmithmotors.com.

C. Reliance Electric/Rockwell Automation: www.reliance.com.

D. Substitutions: See Section 016000 - Product Requirements.

2.2 GENERAL CONSTRUCTION AND REQUIREMENTS

A. Construction:

1. Open drip-proof type except where specifically noted otherwise.
2. Design for continuous operation in 104 degrees F environment.
3. Design for temperature rise in accordance with NEMA MG 1 limits for insulation class, service factor, and motor enclosure type.

B. Construction:

1. Open drip-proof type except where specifically noted otherwise.
2. Design for continuous operation in 40 degrees C environment.
3. Design for temperature rise in accordance with NEMA MG 1 limits for insulation class, service factor, and motor enclosure type.
4. Motors with frame sizes 254T and larger: Energy Efficient Type.

C. Visible Nameplate: Indicating motor horsepower, voltage, phase, cycles, RPM, full load amps, locked rotor amps, frame size, manufacturer's name and model number, service factor, power factor, efficiency.

D. Wiring Terminations:

1. Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70, threaded for conduit.
2. For fractional horsepower motors where connection is made directly, provide threaded conduit connection in end frame.

2.3 APPLICATIONS

A. Exception: Motors less than 250 watts, for intermittent service may be the equipment manufacturer's standard and need not conform to these specifications.

B. Single phase motors for shaft mounted fans: Split phase type.

C. Single phase motors for fans: Capacitor start type.

D. Motors located in exterior locations and direct drive axial fans: Totally enclosed type.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install securely on firm foundation. Mount ball bearing motors with shaft in any position.

C. Check line voltage and phase and ensure agreement with nameplate.

END OF SECTION

SECTION 230516 - EXPANSION FITTINGS AND LOOPS FOR HVAC PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Flexible pipe connectors.

B. Expansion joints and compensators.

C. Pipe loops, offsets, and swing joints.

1.2 RELATED REQUIREMENTS

A. Section 232113 - Hydronic Piping.

B. Section 232300 - Refrigerant Piping.

1.3 REFERENCE STANDARDS

A. EJMA (STDS) - EJMA Standards Tenth Edition.

B. UL (DIR) - Online Certifications Directory Current Edition.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data:

1. Flexible Pipe Connectors: Indicate maximum temperature and pressure rating, face-to-face length, live length, hose wall thickness, hose convolutions per foot and per assembly, fundamental frequency of assembly, braid structure, and total number of wires in braid.
2. Expansion Joints: Indicate maximum temperature and pressure rating, and maximum expansion compensation.

C. Manufacturer's Instructions: Indicate manufacturer's installation instructions, special procedures, and external controls.

D. Maintenance Data: Include adjustment instructions.

E. Project Record Documents: Record installed locations of flexible pipe connectors, expansion joints, anchors, and guides.

1.5 REGULATORY REQUIREMENTS

A. Conform to UL (DIR) requirements.

PART 2 PRODUCTS

2.1 FLEXIBLE PIPE CONNECTORS - STEEL PIPING

A. Manufacturers:

1. Metraflex Company: www.metraflex.com.
2. Substitutions: See Section 016000 - Product Requirements.

B. Inner Hose: Carbon Steel.

C. Exterior Sleeve: Single braided, stainless steel.

D. Pressure Rating: 125 psi and 450 degrees F.

E. Joint: As Specified for Pipe Joints.

F. Size: Use pipe sized units.

G. Maximum offset: 3/4 inch on each side of installed center line.

2.2 FLEXIBLE PIPE CONNECTORS - COPPER PIPING

A. Manufacturer:

1. Metraflex Company: www.metraflex.com.
2. Substitutions: See Section 016000 - Product Requirements.

B. Inner Hose: Bronze.

C. Exterior Sleeve: Braided bronze.

D. Pressure Rating: 125 psi and 450 degrees F.

E. Joint: As specified for pipe joints.

F. Size: Use pipe sized units.

G. Maximum offset: 3/4 inch on each side of installed center line.

H. Application: Copper piping.

2.3 EXPANSION JOINTS - STAINLESS STEEL BELLOWS TYPE

A. Manufacturers:

1. Metraflex Company; [_____]: www.metraflex.com/#sle.
2. Substitutions: See Section 016000 - Product Requirements.

B. Pressure Rating: 125 psi and 400 degrees F.

C. Maximum Compression: 1-3/4 inches.

D. Maximum Extension: 1/4 inch.

E. Joint: As specified for pipe joints.

F. Size: Use pipe sized units.

G. Application: Steel piping 3 inches and under.

2.4 EXPANSION JOINTS - EXTERNAL RING CONTROLLED STAINLESS STEEL BELLOWS TYPE

A. Manufacturers:

1. Metraflex Company; [_____]: www.metraflex.com/#sle.
2. Substitutions: See Section 016000 - Product Requirements.

B. Pressure Rating: 125 psi and 400 degrees F.

C. Maximum Compression: 15/16 inch.

D. Maximum Extension: 5/16 inch.

E. Maximum Offset: 1/8 inch.

F. Joint: Flanged.

G. Size: Use pipe sized units.

H. Accessories: Internal flow liner.

I. Application: Steel piping over 2 inches.

2.5 EXPANSION JOINTS - TWO-PLY BRONZE BELLOWS TYPE

A. Manufacturers:

1. Metraflex Company; [_____]: www.metraflex.com/#sle.
2. Substitutions: See Section 016000 - Product Requirements.

B. Construction: Bronze with anti-torque device, limit stops, internal guides.

C. Pressure Rating: 125 psi and 400 degrees F.

D. Maximum Compression: 1-3/4 inches.

E. Maximum Extension: 1/4 inch.

F. Joint: Soldered.

G. Size: Use pipe sized units.

H. Application: Copper piping.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with EJMA (Expansion Joint Manufacturers Association) Standards.

C. Install flexible pipe connectors on pipes connected to vibration isolated equipment. Provide line size flexible connectors.

D. Install flexible connectors at right angles to displacement. Install one end immediately adjacent to isolated equipment and anchor other end. Install in horizontal plane unless indicated otherwise.

E. Anchor pipe to building structure where indicated. Provide pipe guides so movement is directed along axis of pipe only. Erect piping such that strain and weight is not on cast connections or apparatus.

F. Provide support and equipment required to control expansion and contraction of piping. Provide loops, pipe offsets, and swing joints, or expansion joints where required.

G. Substitute grooved piping for vibration isolated equipment instead of flexible connectors. Grooved piping need not be anchored.

END OF SECTION

SECTION 230523 - GENERAL-DUTY VALVES FOR HVAC PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Applications.

B. General requirements.

C. Angle valves.

D. Globe valves.

E. Ball valves.

F. Butterfly valves.

G. Check valves.

H. Gate valves.

I. Plug valves.

1.2 RELATED REQUIREMENTS

A. Section 078400 - Firestopping.

B. Section 083100 - Access Doors and Panels.

C. Section 230548 - Vibration and Seismic Controls for HVAC.

D. Section 230553 - Identification for HVAC Piping and Equipment.

E. Section 230716 - HVAC Equipment Insulation.

F. Section 230719 - HVAC Piping Insulation.

G. Section 232213 - Steam and Condensate Heating Piping.

1.3 REFERENCE STANDARDS

A. ASME B1.20.1 - Pipe Threads, General Purpose (Inch) 2013 (Reaffirmed 2018).

B. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250 2015.

C. ASME B16.5 - Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24 Metric/Inch Standard 2017.

D. ASME B16.10 - Face-to-Face and End-to-End Dimensions of Valves 2017.

E. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings 2018.

F. ASME B16.34 - Valves - Flanged, Threaded and Welding End 2017.

G. ASME B31.9 - Building Services Piping 2017.

H. ASME BPVC-IX - Qualification Standard for Welding, Brazing, and Fuzing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators - Welding Brazing and Fusing Qualifications 2019.

I. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings 2004 (Reapproved 2019).

J. ASTM A536 - Standard Specification for Ductile Iron Castings 1984 (Reapproved 2014).

K. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings 2017.

L. AWWA C606 - Grooved and Shouldered Joints 2015.

M. MSS SP-68 - High Pressure Butterfly Valves with Offset Design 2017.

N. MSS SP-70 - Cast Iron Gate Valves, Flanged and Threaded Ends 2011.

O. MSS SP-71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends 2018.

P. MSS SP-72 - Ball Valves with Flanged or Butt-Welding Ends for General Service 2010a.

Q. MSS SP-80 - Bronze Gate, Globe, Angle and Check Valves 2013.

R. MSS SP-85 - Cast Iron Globe & Angle Valves, Flanged and Threaded Ends 2011.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on valves including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.

C. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts listings.

1.5 QUALITY ASSURANCE

A. Manufacturer:

1. Obtain valves for each valve type from single manufacturer.
2. Company must specialize in manufacturing products specified in this section, with not less than three years of documented experience.

B. Welding Materials and Procedures: Conform to ASME BPVC-IX.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Use the following precautions during storage:

1. Maintain valve end protection and protect flanges and specialties from dirt.
   a. Provide temporary inlet and outlet caps.
   b. Maintain caps in place until installation.
2. Store valves in shipping containers and maintain in place until installation.
   a. Store valves indoors in dry environment.
   b. Store valves off the ground in watertight enclosures when indoor storage is not an option.

B. Exercise the following precautions for handling:

1. Handle large valves with sling, modified to avoid damage to exposed parts.
2. Avoid the use of operating handles or stems as rigging or lifting points.

PART 2 PRODUCTS

2.1 APPLICATIONS

A. Provide the following valves for the applications if not indicated on Drawings:

1. Throttling (Steam): Butterfly and Gate.
2. Isolation (Shutoff): Butterfly, Gate, and Ball.
3. Swing Check (Pump Outlet):
   a. 2 NPS and Smaller: Bronze with bronze disc.
   b. 2-1/2 NPS and Larger: Iron with lever and weight.

B. Substitutions of valves with higher CWP classes or SWP ratings for same valve types are permitted when specified CWP ratings or SWP classes are not available.

C. Required Valve End Connections for Non-Wafer Types:

1. Steel Pipe:
   a. 2 NPS and Smaller: Threaded ends.
   b. 2-1/2 NPS and Larger: Grooved ends.

D. Low Pressure Steam Valves (15 PSIG or Less):

1. 2 NPS and Smaller, Brass and Bronze Valves:
   a. Angle: Bronze disc, Class 125.
   b. Ball: Full port, one piece, brass trim.
   c. Swing Check: Bronze disc, Class 125.
   d. Gate: NRS, Class 125.
   e. Globe: Bronze disc, Class 125.
2. 2-1/2 NPS and Larger, Iron Valves:
   a. 2-1/2 NPS to 4 NPS: Threaded or Flanged ends.
   b. Ball: 2-1/2 NPS to 10 NPS, Class 150.
   c. Butterfly: High performance, single flange, Class 150.
   d. Swing Check: Metal seats, Class 125.
   e. Swing Check: 2-1/2 NPS to 12 NPS, lever and spring closure. control, Class 125.
   f. Gate: NRS, Class 125.
   g. Globe: 2-1/2 NPS to 12 NPS: Class 125.

E. Steam-Condensate Valves:

1. 2 NPS and Smaller, Brass and Bronze Valves:
   a. Gate: NRS, RS, and [___], Class 125.
   b. Ball: Full port, one piece, brass trim.
   c. Angle: Bronze disc, Class 150.
   d. Globe: Bronze disc, Class 125.
2. 2-1/2 NPS and Larger, Iron Valves:
   a. Provide 2-1/2 NPS to 4 NPS with threaded or flanged ends.
   b. Butterfly: High performance, single flange, Class 300.
   c. Swing Check: Metal seats, Class 125.
   d. Swing Check: Lever and spring closure control, Class 125.
   e. Gate: NRS, Class 125.
   f. Globe: 2-1/2 NPS to 12 NPS, Class 125.

2.2 GENERAL REQUIREMENTS

A. Valve Pressure and Temperature Ratings: No less than rating indicated; as required for system pressures and temperatures.

B. Valve Sizes: Match upstream piping unless otherwise indicated.

C. Valve Actuator Types:

1. Handwheel: Valves other than quarter-turn types.
2. Hand Lever: Quarter-turn valves 6 NPS and smaller.

D. Valves in Insulated Piping: Provide 2 NPS stem extensions and the following features:

1. Gate Valves: Rising stem.
2. Butterfly Valves: Extended neck.
3. Memory Stops: Fully adjustable after insulation is installed.

E. Valve-End Connections:

1. Threaded End Valves: ASME B1.20.1.
2. Flanges on Iron Valves: ASME B16.1 for flanges on iron valves.
3. Pipe Flanges and Flanged Fittings 1/2 NPS through 24 NPS: ASME B16.5.
4. Solder Joint Connections: ASME B16.18.
5. Grooved End Connections: AWWA C606.

F. General ASME Compliance:

1. Ferrous Valve Dimensions and Design Criteria: ASME B16.10 and ASME B16.34.
2. Building Services Piping Valves: ASME B31.9.

G. Bronze Valves:

1. Fabricate from dezincification resistant material.
2. Copper alloys containing more than 15 percent zinc are not permitted.

H. Source Limitations: Obtain each valve type from a single manufacturer.

2.3 BRONZE ANGLE VALVES

A. Class 125: CWP Rating: 200 psig: and Class 150: CWP Rating: 300 psig:.

1. Comply with MSS SP-80, Type 1.
2. Body: Bronze; ASTM B62, with integral seat and screw in bonnet.
3. Ends: Threaded.
4. Stem: Bronze.
5. Disc: Bronze, PTFE, or TFE.
6. Packing: Asbestos free.
7. Handwheel: Bronze or aluminum.

2.4 BRONZE GLOBE VALVES

A. Class 125: CWP Rating: 200 psig:.

1. Comply with MSS SP-80, Type 1.
2. Body: Bronze; ASTM B62, with integral seat and screw in bonnet.
3. Ends: Threaded or solder joint.
4. Stem and Disc: Bronze, PTFE, or [____].
5. Packing: Asbestos free.
   a. Handwheel: Malleable iron.

2.5 IRON GLOBE VALVES

A. Class 125: CWP Rating: 200 psig: and Class 250: CWP Rating: 500 psig:.

1. Comply with MSS SP-85, Type I.
2. Body: Gray iron; ASTM A126, with bolted bonnet.
3. Ends: Flanged.

4. Trim: Bronze.
5. Packing and Gasket: Asbestos free.
6. Operator: Handwheel or chainwheel.

2.6 IRON BALL VALVES

A. Split Body, Full Port:

1. Comply with MSS SP-72.
2. CWP Rating: 200 psig.
3. Body: ASTM A126, gray iron.
4. Ends: Flanged.
5. Seats: PTFE.
6. Stem: Stainless steel.
7. Ball: Stainless steel.

2.7 HIGH-PERFORMANCE SINGLE FLANGE BUTTERFLY VALVES

A. Lug type: Bi-directional dead end service without downstream flange.

1. Comply with MSS SP-68.
2. Class 150: CWP Rating: 285 psig and Class 300: CWP Rating: 720 psig at 100 degrees F.
3. Body: Provide carbon steel, cast iron, ductile Iron, or stainless steel.
4. Seat: Metal or reinforced PTFE.
5. Offset stem: Stainless steel.
6. Disc: Carbon steel.

2.8 BRONZE SWING CHECK VALVES

A. Class 125: CWP Rating: 200 psig (1380 kPa) and Class 150: CWP Rating: 300 psig (2070 kPa).

1. Comply with MSS SP-80, Type 3.
2. Body Design: Horizontal flow.
3. Body Material: Bronze, ASTM B62.
4. Ends: Threaded.
5. Disc: Bronze.

2.9 IRON, FLANGED END SWING CHECK VALVES

A. Class 125: CWP Rating: 200 psig (1380 kPa) with Metal Seats, Class 125: CWP Rating: 150 psig (1035 kPa) with Metal Seats, Class 250: CWP Rating: 500 psig (3450 kPa) with Metal Seats, Class 250: CWP Rating: 300 psig (2070 kPa) with Metal Seats, and Class 125: CWP Rating: 200 psig (1380 kPa) with Nonmetallic-to-Metal Seats.

1. Comply with MSS SP-71, Type I.

2. Design: Clear or full waterway with flanged ends.
3. Body: Gray iron with bolted bonnet in accordance with ASTM A126.
4. Trim: Bronze.
5. Disc Holder: Bronze.
6. Disc: PTFE or TFE.
7. Gasket: Asbestos free.

2.10 IRON, GROOVED-END SWING CHECK VALVES

A. 300 CWP:

1. 2 NPS to 8 NPS.
2. CWP Rating: 300 psig.
3. Body Material: ASTM A536, Grade 65-45-12 ductile iron.
4. Seal: EPDM or Nitrile.
5. Disc: Ductile iron.
6. Coating: Black, non-lead paint.
7. Manufacturers:
   a. Victaulic.
   b. Substitutions: See Section 016000 - Product Requirements.

2.11 BRONZE GATE VALVES

A. Non-Rising Stem (NRS) or Rising Stem (RS):

1. Comply with MSS SP-80, Type I.
2. Class125: CWP Rating: 200 psig.
3. Body Material: Bronze with integral seat and union-ring bonnet.
4. Ends: Threaded or solder joint.
5. Stem: Bronze.
6. Disc: Solid wedge; bronze.
7. Packing: Asbestos free.
8. Handwheel: Malleable iron, bronze, or aluminum.

2.12 IRON GATE VALVES

A. NRS or OS & Y:

1. Comply with MSS SP-70, Type I.
2. Class 125: 2-1/2 NPS to 12 NPS, CWP Rating: 200 psig.
3. Body Material: Gray iron with bolted bonnet.
4. Ends: Flanged.
5. Trim: Bronze.
6. Disc: Solid wedge.
7. Packing and Gasket: Asbestos free.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify valve parts to be fully operational in all positions from closed to fully open.

B. Confirm gasket material to be suitable for the service, to be of correct size, and without defects that could compromise effectiveness.

C. Should valve is determined to be defective, replace with new valve.

3.2 INSTALLATION

A. Provide unions or flanges with valves to facilitate equipment removal and maintenance while maintaining system operation and full accessibility for servicing.

B. Provide separate valve support as required and locate valve with stem at or above center of piping, maintaining unimpeded stem movement.

C. Install check valves where necessary to maintain direction of flow as follows:

1. Swing Check: Install horizontal maintaining hinge pin level.

END OF SECTION

SECTION 230529 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Support and attachment components for equipment, piping, and other HVAC/hydronic work.

1.2 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.

C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel 2019.

D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.

E. MFMA-4 - Metal Framing Standards Publication 2004.

F. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation 2018.

G. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

PART 2 PRODUCTS

2.1 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:

1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of plumbing work.
2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported. Include consideration for vibration, equipment operation, and shock loads where applicable.

4. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
5. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
    a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
    b. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
    c. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

B. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.

1. Comply with MFMA-4.

C. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.

D. Pipe Supports:

1. Liquid Temperatures Up To 122 degrees F:
    a. Overhead Support: MSS SP-58 Types 1, 3 through 12.
    b. Support From Below: MSS SP-58 Types 35 through 38.
2. Operating Temperatures from 122 to 446 degrees F:
    a. Overhead Support: MSS SP-58 Type 1 or 3 through 12, with appropriate saddle of MSS SP-58 Type 40 for insulated pipe.

E. Riser Clamps:

1. For insulated pipe runs, provide two bolt-type clamps designed for installation under insulation.

F. Insulation Clamps: Two bolt-type clamps designed for installation under insulation.

G. Pipe Shields for Insulated Piping:

1. General Construction and Requirements:
    a. Surface Burning Characteristics: Comply with ASTM E84 or UL 723.
    b. Shields Material: UV-resistant polypropylene with glass fill.
    c. Maximum Insulated Pipe Outer Diameter: 12-5/8 inch.
    d. Minimum Service Temperature: Minus 40 degrees F.
    e. Maximum Service Temperature: 178 degrees F.
    f. Pipe shields to be provided at hanger, support, and guide locations on pipe requiring insulation or additional support.

H. Anchors and Fasteners:

1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive support and attachment components.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Provide independent support from building structure. Do not provide support from piping, ductwork, conduit, or other systems.

C. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.

D. Unless specifically indicated or approved by Architect, do not provide support from roof deck.

E. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.

F. Equipment Support and Attachment:

1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.

G. Secure fasteners according to manufacturer's recommended torque settings.

H. Remove temporary supports.

END OF SECTION

SECTION 230553 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Nameplates.

B. Tags.

C. Adhesive-backed duct markers.

D. Stencils.

E. Pipe markers.

F. Ceiling tacks.

1.2 RELATED REQUIREMENTS

A. Section 099123 - Interior Painting: Identification painting.

1.3 REFERENCE STANDARDS

A. ASME A13.1 - Scheme for the Identification of Piping Systems 2015.

B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials 2017.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.

C. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.

D. Product Data: Provide manufacturers catalog literature for each product required.

E. Manufacturer's Installation Instructions: Indicate special procedures, and installation.

F. Project Record Documents: Record actual locations of tagged valves.

PART 2 PRODUCTS

2.1 IDENTIFICATION APPLICATIONS

A. Air Terminal Units: Tags.

B. Automatic Controls: Tags. Key to control schematic.

C. Control Panels: Nameplates.

D. Dampers: Ceiling tacks, where located above lay-in ceiling.

E. Instrumentation: Tags.

F. Major Control Components: Nameplates.

G. Piping: Pipe markers.

H. Pumps: Nameplates.

I. Relays: Tags.

J. Small-sized Equipment: Tags.

K. Tanks: Nameplates.

L. Thermostats: Nameplates.

M. Valves: Tags.

2.2 NAMEPLATES

A. Manufacturers:

1. Advanced Graphic Engraving, LLC: www.advancedgraphicengraving.com.
2. Brimar Industries, Inc.: www.pipemarker.com.
3. Kolbi Pipe Marker Co.: www.kolbipipemarkers.com.
4. Seton Identification Products, a Tricor Direct Company: www.seton.com.
5. Substitutions: See Section 016000 - Product Requirements.

B. Letter Color: White.

C. Letter Height: 1/4 inch.

D. Background Color: Black.

E. Plastic: Conform to ASTM D709.

2.3 TAGS

A. Manufacturers:

1. Advanced Graphic Engraving: www.advancedgraphicengraving.com.
2. Brady Corporation: www.bradycorp.com.
3. Brimar Industries, Inc.: www.pipemarker.com.
4. Kolbi Pipe Marker Co.: www.kolbipipemarkers.com.
5. Seton Identification Products, a Tricor Company: www.seton.com.
6. Substitutions: See Section 016000 - Product Requirements.

B. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch diameter.

C. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.

2.4 ADHESIVE-BACKED DUCT MARKERS

A. Manufacturers:

1. Brimar Industries, Inc: www.pipemarker.com.
2. Substitutions: See Section 016000 - Product Requirements.

B. Material: High gloss acrylic adhesive-backed vinyl film 0.0032 inch; printed with UV and chemical resistant inks.

C. Style: Individual Label.

D. Color: Yellow/Black.

2.5 STENCILS

A. Manufacturers:

1. Brady Corporation: www.bradycorp.com.
2. Kolbi Pipe Marker Co.: www.kolbipipemarkers.com.
3. Seton Identification Products, a Tricor Company: www.seton.com.
4. Substitutions: See Section 016000 - Product Requirements.

B. Stencils: With clean cut symbols and letters of following size:

1. 3/4 to 1-1/4 inch Outside Diameter of Insulation or Pipe: 8 inch long color field, 1/2 inch high letters.
2. 1-1/2 to 2 inch Outside Diameter of Insulation or Pipe: 8 inch long color field, 3/4 inch high letters.
3. 2-1/2 to 6 inch Outside Diameter of Insulation or Pipe: 12 inch long color field, 1-1/4 inch high letters.
4. 8 to 10 inch Outside Diameter of Insulation or Pipe: 24 inch long color field, 2-1/2 inch high letters.

5. Ductwork and Equipment: 2-1/2 inch high letters.

C. Stencil Paint: As specified in Section 099123, semi-gloss enamel, colors conforming to ASME A13.1.

2.6 PIPE MARKERS

A. Manufacturers:

1. Brady Corporation: www.bradycorp.com.
2. Brimar Industries, Inc.: www.pipemarker.com.
3. Kolbi Pipe Marker Co.: www.kolbipipemarkers.com.
4. MIFAB, Inc.: www.mifab.com.
5. Seton Identification Products, a Tricor Company: www.seton.com.
6. Substitutions: See Section 016000 - Product Requirements.

B. Color: Conform to ASME A13.1.

C. Plastic Pipe Markers: Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.

D. Color code as follows:

1. Heating, Cooling, and Boiler Feedwater: Green with white letters.

2.7 CEILING TACKS

A. Manufacturers:

1. Craftmark: www.craftmarkid.com.
2. Substitutions: See Section 016000 - Product Requirements.

B. Description: Steel with 3/4 inch diameter color coded head.

C. Color code as follows:

1. HVAC Equipment: Yellow.
2. Heating/Cooling Valves: Blue.

PART 3 EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

B. Prepare surfaces in accordance with Section 099123 for stencil painting.

3.2 INSTALLATION

A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

B. Install tags with corrosion resistant chain.

C. Install plastic pipe markers in accordance with manufacturer's instructions.

D. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

E. Use tags on piping 3/4 inch diameter and smaller.

1. Identify service, flow direction, and pressure.
2. Install in clear view and align with axis of piping.
3. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION

SECTION 230719 - HVAC PIPING INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Piping insulation.

B. Jackets and accessories.

1.2 RELATED REQUIREMENTS

A. Section 078400 - Firestopping.

B. Section 232213 - Steam and Condensate Heating Piping: Placement of hangers and hanger inserts.

C. Section 232300 - Refrigerant Piping: Placement of inserts.

1.3 REFERENCE STANDARDS

A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus 2019.

B. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement 2007 (Reapproved 2013).

C. ASTM C449 - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement 2007 (Reapproved 2013).

D. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus 2017.

E. ASTM C533 - Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation 2017.

F. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form 2016.

G. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation 2019.

H. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel 2008 (Reapproved 2018).

I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.

J. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.

K. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum 3 years of experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.7 FIELD CONDITIONS

A. Maintain ambient conditions required by manufacturers of each product.

B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84, UL 723, ASTM E84, or UL 723.

2.2 GLASS FIBER

A. Manufacturers:

1. CertainTeed Corporation: www.certainteed.com.

2. Johns Manville Corporation: www.jm.com.
3. Knauf Insulation: www.knaufinsulation.com.
4. Owens Corning Corporation; Fiberglas Pipe Insulation ASJ: www.ocbuildingspec.com/#sle.
5. Owens Corning Corporation; VaporWick Pipe Insulation: www.ocbuildingspec.com/#sle.
6. Substitutions: See Section 016000 - Product Requirements.

B. Insulation: ASTM C547and ASTM C795; semi-rigid, noncombustible, end grain adhered to jacket.

1. 'K' Value: ASTM C177, 0.24 at 75 degrees F.
2. Maximum Service Temperature: 650 degrees F.
3. Maximum Moisture Absorption: 0.2 percent by volume.

C. Vapor Barrier Jacket: White kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.

D. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.

E. Vapor Barrier Lap Adhesive: Compatible with insulation.

F. Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.

G. Fibrous Glass Fabric:

1. Cloth: Untreated; 9 oz/sq yd weight.
2. Blanket: 1.0 lb/cu ft density.
3. Weave: 5 by 5.

H. Indoor Vapor Barrier Finish:

1. Cloth: Untreated; 9 oz/sq yd weight.
2. Vinyl emulsion type acrylic, compatible with insulation, black color.

I. Insulating Cement: ASTM C449.

2.3 HYDROUS CALCIUM SILICATE

A. Manufacturers:

1. Johns Manville Corporation: www.jm.com.
2. Substitutions: See Section 016000 - Product Requirements.

B. Insulation: ASTM C533 and ASTM C795; rigid molded, asbestos free, gold color.

1. 'K' Value: 0.40 at 300 degrees F, when tested in accordance with ASTM C177 or ASTM C518.
2. Maximum Service Temperature: 1200 degrees F.
3. Density: 15 lb/cu ft.

C. Insulating Cement: ASTM C449.

2.4 JACKETS

A. PVC Plastic.

1. Manufacturers:
   a. Johns Manville Corporation: www.jm.com.
   b. Substitutions: See Section 016000 - Product Requirements.
2. Jacket: One piece molded type fitting covers and sheet material, off-white color.
   a. Minimum Service Temperature: 0 degrees F.
   b. Maximum Service Temperature: 150 degrees F.
   c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.
   d. Thickness: 10 mil.
   e. Connections: Brush on welding adhesive.
3. Covering Adhesive Mastic: Compatible with insulation.

B. Canvas Jacket: UL listed 6 oz/sq yd plain weave cotton fabric treated with dilute fire retardant lagging adhesive.

1. Lagging Adhesive: Compatible with insulation.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that piping has been tested before applying insulation materials.

B. Verify that surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with NAIMA National Insulation Standards.

C. Exposed Piping: Locate insulation and cover seams in least visible locations.

D. Insulated pipes conveying fluids below ambient temperature; insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.

E. Glass fiber insulated pipes conveying fluids below ambient temperature:

1. Provide vapor barrier jackets, factory-applied or field-applied; secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.

F. For hot piping conveying fluids over 90 degrees F, insulate flanges and unions at equipment.

G. Glass fiber insulated pipes conveying fluids above ambient temperature.

1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples.
2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.

H. Inserts and Shields:

1. Application: Piping 1-1/2 inches diameter or larger.
2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
3. Insert location: Between support shield and piping and under the finish jacket.
4. Insert Configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
5. Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.

I. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, refer to Section 078400.

J. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces: Finish with PVC jacket and fitting covers. Clean all PVC in Finished Spaces thoroughly of grease and oil.

3.3 SCHEDULE

A. Heating Systems:

1. Low Pressure Steam Piping: 3"
2. Low Pressure Steam Condensate: 2"
3. Boiler Feed Water: 1"

END OF SECTION

SECTION 230800 - COMMISSIONING OF HVAC

PART 1 GENERAL

1.1 SUMMARY

A. See Section 019113 - General Commissioning Requirements for overall objectives; comply with the requirements of Section 019113.

B. This section covers the Contractor's responsibilities for commissioning; each subcontractor or installer responsible for the installation of a particular system or equipment item to be commissioned is responsible for the commissioning activities relating to that system or equipment item.

C. The Commissioning Authority (CA) directs and coordinates all commissioning activities and provides Prefunctional Checklists and Functional Test Procedures for Contractor's use.

D. The entire HVAC system is to be commissioned, including commissioning activities for the following specific items:

1. Control system.
2. Major and minor equipment items.
3. Piping systems and equipment.
4. Ductwork and accessories.
5. Terminal units.
6. Sound control devices.
7. Vibration control devices.
8. Variable frequency drives.
9. Special Ventilation:
    a. Specialty fans.
10. Other equipment and systems explicitly identified elsewhere in Contract Documents as requiring commissioning.
11. Indoor Air Quality Procedures: The Commissioning Authority will coordinate; Contractor will execute; see Section 015719.

E. The Prefunctional Checklist and Functional Test requirements specified in this section are in addition to, not a substitute for, inspection or testing specified in other sections.

1.2 RELATED REQUIREMENTS

A. Section 017800 - Closeout Submittals: Scope and procedures for operation and maintenance manuals and project record documents.

B. Section 017900 - Demonstration and Training: Scope and procedures for Owner personnel training.

C. Section 019113 - General Commissioning Requirements: Commissioning requirements that apply to all types of work.

D. Section 230923 - Direct-Digital Control System for HVAC.

E. Section 230913 - Instrumentation and Control Devices for HVAC.

F. Section 230993 - Sequence of Operations for HVAC Controls.

G. Section 230593 - Testing, Adjusting, and Balancing for HVAC.

1.3 REFERENCE STANDARDS

A. ASHRAE Guideline 1.1 - The HVAC&R Technical Requirements for the Commissioning Process 2007, with Errata (2012).

1.4 SUBMITTALS

A. Updated Submittals: Keep the Commissioning Authority informed of all changes to control system documentation made during programming and setup; revise and resubmit when substantial changes are made.

B. DRAFT Prefunctional Checklists and Functional Test Procedures for Control System: Detailed written plan indicating the procedures to be followed to test, checkout and adjust the control system prior to full system Functional Testing; include at least the following for each type of equipment controlled:

1. System name.
2. List of devices.
3. Step-by-step procedures for testing each controller after installation, including:
    a. Process of verifying proper hardware and wiring installation.
    b. Process of downloading programs to local controllers and verifying that they are addressed correctly.
    c. Process of performing operational checks of each controlled component.
    d. Plan and process for calibrating valve and damper actuators and all sensors.
    e. Description of the expected field adjustments for transmitters, controllers and control actuators should control responses fall outside of expected values.
4. Copy of proposed log and field checkout sheets to be used to document the process; include space for initial and final read values during calibration of each point and space to specifically indicate when a sensor or controller has “passed” and is operating within the contract parameters.
5. Description of the instrumentation required for testing.
6. Indicate what tests on what systems should be completed prior to TAB using the control system for TAB work. Coordinate with the Commissioning Authority and TAB contractor for this determination.

C. Startup Reports, Prefunctional Checklists, and Trend Logs: Submit for approval of Commissioning Authority.

D. HVAC Control System O&M Manual Requirements. In addition to documentation specified elsewhere, compile and organize at minimum the following data on the control system:

1. Specific step-by-step instructions on how to perform and apply all functions, features, modes, etc. mentioned in the controls training sections of this specification and other features of this system. Provide an index and clear table of contents. Include the detailed technical manual for programming and customizing control loops and algorithms.
2. Full as-built set of control drawings.
3. Full as-built sequence of operations for each piece of equipment.
4. Full points list; in addition to the information on the original points list submittal, include a listing of all rooms with the following information for each room:
    a. Floor.
    b. Room number.
    c. Room name.
    d. Air handler unit ID.
    e. Reference drawing number.
    f. Air terminal unit tag ID.
    g. Heating and/or cooling valve tag ID.
    h. Minimum air flow rate.
    i. Maximum air flow rate.
5. Full print out of all schedules and set points after testing and acceptance of the system.
6. Full as-built print out of software program.
7. Electronic copy on disk of the entire program for this facility.
8. Marking of all system sensors and thermostats on the as-built floor plan and HVAC drawings with their control system designations.
9. Maintenance instructions, including sensor calibration requirements and methods by sensor type, etc.
10. Control equipment component submittals, parts lists, etc.
11. Warranty requirements.
12. Copies of all checkout tests and calibrations performed by the Contractor (not commissioning tests).
13. Organize and subdivide the manual with permanently labeled tabs for each of the following data in the given order:
    a. Sequences of operation.
    b. Control drawings.
    c. Points lists.
    d. Controller and/or module data.
    e. Thermostats and timers.
    f. Sensors and DP switches.
    g. Valves and valve actuators.
    h. Dampers and damper actuators.
    i. Program setups (software program printouts).

E. Project Record Documents: See Section 017800 for additional requirements.

1. Submit updated version of control system documentation, for inclusion with operation and maintenance data.
2. Show actual locations of all static and differential pressure sensors (air, water and building pressure) and air-flow stations on project record drawings.

F. Draft Training Plan: In addition to requirements specified in Section 017900, include:

1. Follow the recommendations of ASHRAE Guideline 1.1.
2. Control system manufacturer's recommended training.
3. Demonstration and instruction on function and overrides of any local packaged controls not controlled by the HVAC control system.

G. Training Manuals: See Section 017900 for additional requirements.

1. Provide three extra copies of the controls training manuals in a separate manual from the O&M manuals.

PART 2 PRODUCTS

2.1 TEST EQUIPMENT

A. Provide all standard testing equipment required to perform startup and initial checkout and required functional performance testing; unless otherwise noted such testing equipment will NOT become the property of Owner.

B. Equipment-Specific Tools: Where special testing equipment, tools and instruments are specific to a piece of equipment, are only available from the vendor, and are required in order to accomplish startup or Functional Testing, provide such equipment, tools, and instruments as part of the work at no extra cost to Owner; such equipment, tools, and instruments are to become the property of Owner.

PART 3 EXECUTION

3.1 PREPARATION

A. Cooperate with the Commissioning Authority in development of the Prefunctional Checklists and Functional Test Procedures.

B. Furnish additional information requested by the Commissioning Authority.

C. Prepare a preliminary schedule for HVAC pipe and duct system testing, flushing and cleaning, equipment start-up and testing, adjusting, and balancing start and completion for use by the Commissioning Authority; update the schedule as appropriate.

D. Notify the Commissioning Authority when pipe and duct system testing, flushing, cleaning, startup of each piece of equipment and testing, adjusting, and balancing will occur; when commissioning activities not yet performed or not yet scheduled will delay construction notify ahead of time and be proactive in seeing that the Commissioning Authority has the scheduling information needed to efficiently execute the commissioning process.

E. Put all HVAC equipment and systems into operation and continue operation during each working day of testing, adjusting, and balancing and commissioning, as required.

1. Include cost of sheaves and belts that may be required for testing, adjusting, and balancing.

F. Provide test holes in ducts and plenums where directed to allow air measurements and air balancing; close with an approved plug.

G. Provide temperature and pressure taps in accordance with the contract documents.

1. Provide a pressure/temperature plug at each water sensor that is an input point to the control system.

3.2 INSPECTING AND TESTING - GENERAL

A. Submit startup plans, startup reports, and Prefunctional Checklists for each item of equipment or other assembly to be commissioned.

B. Perform the Functional Tests directed by the Commissioning Authority for each item of equipment or other assembly to be commissioned.

C. Provide two-way radios for use during the testing.

D. Valve/Damper Stroke Setup and Check:

1. For all valve/damper actuator positions checked, verify the actual position against the control system readout.
2. Set pump/fan to normal operating mode.
3. Command valve/damper closed; visually verify that valve/damper is closed and adjust output zero signal as required.
4. Command valve/damper open; verify position is full open and adjust output signal as required.
5. Command valve/damper to a few intermediate positions.
6. If actual valve/damper position does not reasonably correspond, replace actuator or add pilot positioner (for pneumatics).
7. Closure for Heating Coil Valves - Normally Open:
    a. Set heating setpoint 20 degrees F above room temperature.
    b. Observe valve open.
    c. Remove control air or power from the valve and verify that the valve stem and actuator position do not change.
    d. Restore to normal.
    e. Set heating setpoint to 20 degrees F below room temperature.
    f. Observe the valve close.
    g. Restore to normal.
8. Closure for Cooling Coil Valves - Normally Closed:
    a. Set cooling setpoint 20 degrees F above room temperature.
    b. Observe the valve close.

c. Remove control air or power from the valve and verify that the valve stem and actuator position do not change.
d. Restore to normal.
e. Set cooling setpoint to 20 degrees F below room temperature.
f. Observe valve open.
g. Restore to normal.

E. Coil Valve Leak Check:

1. Method 1 - Water Temperature With 2-Way Valve:
   a. Calibrate water temperature sensors on each side of coil to be within 0.2 degree F of each other.
   b. Turn off air handler fans, close outside air dampers. Keep pump running. Make sure appropriate coil dampers are open.
   c. Normally closed valves will close.
   d. Override normally open valves to the closed position.
   e. After 10 minutes observe water delta T across coil. If it is greater than 2 degrees F (, leakage is probably occurring.
   f. Reset valve stroke to close tighter.
   g. Repeat test until compliance is achieved.
2. Method 2 - Air Temperature With 2 or 3-Way Valve: Water leak-by less than 10 percent will likely not be detected with this method.
   a. Calibrate air temperature sensors on each side of coil to be within 0.2 degree F of each other.
   b. Air handler fans should be on.
   c. Change mixed or discharge air setpoint, override values or bleed or squeeze bulb pneumatic controller to cause the valve to close.
   d. After 5 minutes observe air delta T across coil. If it is greater than one degree F (, leakage is probably occurring.
   e. Reset valve stroke to close tighter.
   f. Repeat test until compliance is achieved.
3. Method 3 - Coil Drain Down: Not for 3-way valves.
   a. Put systems in normal mode.
   b. If cooling coil valve, remove all call for cooling; if heating coil valve, put system in full cooling.
   c. Close isolation valve on supply side of coil, open air bleed cap, open drain-down cock and drain water from coil.
   d. If water does not stop draining, there may be a leak through the control valve.
   e. Return all to normal when done.

F. Isolation Valve or System Valve Leak Check: For valves not by coils.

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

G. Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to Owner.

3.3 TAB COORDINATION

A. TAB: Testing, adjusting, and balancing of HVAC.

B. Coordinate commissioning schedule with TAB schedule.

C. Review the TAB plan to determine the capabilities of the control system toward completing TAB.

D. Provide all necessary unique instruments and instruct the TAB technicians in their use; such as handheld control system interface for setting terminal unit boxes, etc.

E. Have all required Prefunctional Checklists, calibrations, startup and component Functional Tests of the system completed and approved by the Commissioning Authority prior to starting TAB.

F. Provide a qualified control system technician to operate the controls to assist the TAB technicians or provide sufficient training for the TAB technicians to operate the system without assistance.

3.4 CONTROL SYSTEM FUNCTIONAL TESTING

A. Prefunctional Checklists for control system components will require a signed and dated certification that all system programming is complete as required to accomplish the requirements of the Contract Documents and the detailed Sequences of Operation documentation submittal.

B. Do not start Functional Testing until all controlled components have themselves been successfully Functionally Tested in accordance with the contract documents.

C. Using a skilled technician who is familiar with this building, execute the Functional Testing of the control system as required by the Commissioning Authority.

D. Functional Testing of the control system constitutes demonstration and trend logging of control points monitored by the control system.

1. The scope of trend logging is partially specified; trend log up to 50 percent more points than specified at no extra cost to Owner.
2. Perform all trend logging specified in Prefunctional Checklists and Functional Test procedures.

E. Functionally Test integral or stand-alone controls in conjunction with the Functional Tests of the equipment they are attached to, including any interlocks with other equipment or systems; further testing during control system Functional Test is not required unless specifically indicated below.

F. Demonstrate the following to the Commissioning Authority during testing of controlled equipment; coordinate with commissioning of equipment.

1. Setpoint changing features and functions.
2. Sensor calibrations.

G. Demonstrate to the Commissioning Authority:

1. That all specified functions and features are set up, debugged and fully operable.
2. That scheduling features are fully functional and setup, including holidays.
3. That all graphic screens and value readouts are completed.
4. Correct date and time setting in central computer.
5. That field panels read the same time as the central computer; sample 10 percent of field panels; if any of those fail, sample another 10 percent; if any of those fail test all remaining units at no extra cost to Owner.
6. Functionality of field panels using local operator keypads and local ports (plug-ins) using portable computer/keypad; demonstrate 100 percent of panels and 10 percent of ports; if any ports fail, sample another 10 percent; if any of those fail, test all remaining units at no extra cost to Owner.
7. Power failure and battery backup and power-up restart functions.
8. Global commands features.
9. Security and access codes.
10. Occupant over-rides (manual, telephone, key, keypad, etc.).
11. O&M schedules and alarms.
12. Occupancy sensors and controls.
13. Communications to remote sites.
14. Fire alarm interlocks and response.
15. Fire protection and suppression systems interfaces.
16. That points that are monitored only, having no control function, are reporting properly to the control system.
17. All control strategies and sequences not tested during controlled equipment testing.
18. Trend logging and graphing features that are specified.
19. Other integrated tests specified in the contract documents
20. That control system features that are included but not specified to be setup are actually installed.

H. Perform and submit trend logging on the following using the control system, for minimum period of 5 days including one weekend, if the control points are monitored by the control system:

I. If the control system, integral control components, or related equipment do not respond to changing conditions and parameters appropriately as expected, as specified and according to acceptable operating practice, under any of the conditions, sequences, or modes tested, correct all systems, equipment, components, and software required at no additional cost to Owner.

3.5 OPERATION AND MAINTENANCE MANUALS

A. See Section 017800 for additional requirements.

B. Add design intent documentation furnished by Architect to manuals prior to submission to Owner.

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

D. Commissioning Authority will add commissioning records to manuals after submission to Owner.

3.6 DEMONSTRATION AND TRAINING

A. See Section 017900 for additional requirements.

B. Demonstrate operation and maintenance of HVAC system to Owner' personnel; if during any demonstration, the system fails to perform in accordance with the information included in the O&M manual, stop demonstration, repair or adjust, and repeat demonstration. Demonstrations may be combined with training sessions if appropriate.

C. These demonstrations are in addition to, and not a substitute for, Prefunctional Checklists and demonstrations to the Commissioning Authority during Functional Testing.

D. Provide classroom and hands-on training of Owner's designated personnel on operation and maintenance of the HVAC system, control system, and all equipment items indicated to be commissioned. Provide the following minimum durations of training:

1. HVAC Control System: 4 hours.
2. Chillers and System: 3 hours.
3. Boilers and System: 3 hours.
4. Chemical Treatment: 5 hours.
5. Air Handling Units: 1 hours.
6. Variable Speed Drives: 1 hours.
7. Air Terminal Units: 5 hours.
8. Packaged Rooftop Units: 1 hours.
9. Split System AC or Heat Pumps: 1 hours.
10. Specialty Exhaust Fans: 2 hours.

E. TAB Review: Instruct Owner's personnel for minimum 1 hours, after completion of TAB, on the following:

1. Review final TAB report, explaining the layout and meanings of each data type.
2. Discuss any outstanding deficient items in control, ducting or design that may affect the proper delivery of air or water.
3. Identify and discuss any terminal units, duct runs, diffusers, coils, fans and pumps that are close to or are not meeting their design capacity.
4. Discuss any temporary settings and steps to finalize them for any areas that are not finished.
5. Other salient information that may be useful for facility operations, relative to TAB.

F. HVAC Control System Training: Perform training in at least three phases:

1. Phase 1 - Basic Control System: Provide minimum of 2 hours of actual training on the control system itself. Upon completion of training, each attendee, using appropriate documentation, should be able to perform elementary operations and describe general hardware architecture and functionality of the system.
    a. This training may be held on-site or at the manufacturer's facility.

b. If held off-site, the training may occur prior to final completion of the system installation.
c. For off-site training, Contractor shall pay expenses of up to two attendees.

2. Phase 2 - Integrating with HVAC Systems: Provide minimum of 2 hours of on-site, hands-on training after completion of Functional Testing. Include instruction on:
   a. The specific hardware configuration of installed systems in this facility and specific instruction for operating the installed system, including interfaces with other systems, if any.
   b. Security levels, alarms, system start-up, shut-down, power outage and restart routines, changing setpoints and alarms and other typical changed parameters, overrides, freeze protection, manual operation of equipment, optional control strategies that can be considered, energy savings strategies and set points that if changed will adversely affect energy consumption, energy accounting, procedures for obtaining vendor assistance, etc.
   c. Trend logging and monitoring features (values, change of state, totalization, etc.), including setting up, executing, downloading, viewing both tabular and graphically and printing trends; provide practice in setting up trend logging and monitoring during training session.
   d. Every display screen, allowing time for questions.
   e. Point database entry and modifications.
3. Phase 3 - Post-Occupancy: Six months after occupancy conduct minimum of [____] hours of training. Tailor training session to questions and topics solicited beforehand from Owner. Also be prepared to address topics brought up and answer questions concerning operation of the system.

G. Provide the services of manufacturer representatives to assist instructors where necessary.

H. Provide the services of the HVAC controls instructor at other training sessions, when requested, to discuss the interaction of the controls system as it relates to the equipment being discussed.

END OF SECTION

SECTION 230913 - INSTRUMENTATION AND CONTROL DEVICES FOR HVAC

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Thermostats.

1.2 RELATED REQUIREMENTS

A. Section 23 0923 - Building Management System

B. Section 232114 - Hydronic Specialties.

C. Section 233300 - Air Duct Accessories: Installation of automatic dampers.

D. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections.

E. Section 262726 - Wiring Devices: Elevation of exposed components.

1.3 REFERENCE STANDARDS

A. AMCA 500-D - Laboratory Methods of Testing Dampers for Rating 2018.

B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2018.

C. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems 2018.

D. UL 94 - Tests for Flammability of Plastic Materials for Parts in Devices and Appliances Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

B. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

1.5 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide description and engineering data for each control system component. Include sizing as requested. Provide data for each system component and software module.

C. Shop Drawings: Indicate complete operating data, system drawings, wiring diagrams, and written detailed operational description of sequences. Submit schedule of valves indicating size, flow, and pressure drop for each valve. For automatic dampers indicate arrangement, velocities, and static pressure drops for each system.

D. Operation and Maintenance Data: Include inspection period, cleaning methods, recommended cleaning materials, and calibration tolerances.

E. Project Record Documents: Record actual locations of control components, including panels, thermostats, and sensors. Accurately record actual location of control components, including panels, thermostats, and sensors.

F. Warranty: Submit manufacturers warranty and ensure forms have been filled out in Owner s name and registered with manufacturer.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 016000 - Product Requirements, for additional provisions.
2. Extra Thermostats and Other Exposed Sensors: One of each type.

1.6 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 with minimum 3 years experience approved by manufacturer.

C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

1.7 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a five year period after Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Refer to 23 0923.

2.2 EQUIPMENT - GENERAL

A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

2.3 CONTROL PANELS

A. Unitized cabinet type for each system under automatic control with relays and controls mounted in cabinet and temperature indicators, pressure gauges, pilot lights, push buttons and switches flush on cabinet panel face.

B. NEMA 250, general purpose utility enclosures with enamelled finished face panel.

C. Provide common keying for all panels.

2.4 CONTROL VALVES

A. Globe Pattern:

1. Manufacturers:
   a. Flow Controls.
   b. IMI-TA.
   c. Siemens.
   d. Substitutions: See Section 016000 - Product Requirements.
2. Up to 2 inches: Bronze body, bronze trim, rising stem, renewable composition disc, screwed ends with backseating capacity repackable under pressure.
3. Over 2 inches: Iron body, bronze trim, rising stem, plug-type disc, flanged ends, renewable seat and disc.
4. Hydronic Systems:
   a. Rate for service pressure of 125 psig at 250 degrees F.
   b. Replaceable plugs and seats of stainless steel.
   c. Size for 5-70 psig minimum and maximum pressure drop at design flow rate.
   d. Three way or six way control valves shall be modulating. Refer to schedules for valve type design.
   e. Two way valves shall be two position, modulating, or pressure independent design. Refer to schedules for valve type and configuration.

B. Electronic Operators:

1. Manufacturers:
   a. As provided by valve manufacturer.
2. Voltage:.
   a. 24VACDC
3. Select operator for full shut off at maximum pump differential pressure.

2.5 CONTROL DAMPERS

A. Manufacturers:

1. Ruskin.
2. Substitutions: See Section 016000 - Product Requirements.

B. Performance: Test in accordance with AMCA 500-D.

C. Frames: Galvanized steel, welded or riveted with corner reinforcement, minimum 12 gage, 0.1046 inch.

D. Blades: Extruded aluminum airfoil parallel blade type with maximum blade size 8 inches wide, 48 inches long, minimum 22 gage, 0.0299 inch, attached to minimum 1/2 inch shafts with set screws.

E. Blade Seals: Extruded Ruskiprene (TPR) mechanically attached, field replaceable.

F. Jamb Seals: Flexible metal compression type.

G. Shaft Bearings: Molded Synthetic.

H. Linkage Bearings: Graphite impregnated nylon.

I. Leakage: Less than one percent based on approach velocity of 2000 ft/min and 4 inches wg.

J. Maximum Pressure Differential: 6 inches wg.

K. Temperature Limits: -40 to 200 degrees F.

2.6 DAMPER OPERATORS

A. General: Provide smooth proportional control with sufficient power for air velocities 20 percent greater than maximum design velocity and to provide tight seal against maximum system pressures. Provide spring return for two position control and for fail safe operation.

1. Provide sufficient number of operators to achieve unrestricted movement throughout damper range.
2. Provide one operator for maximum 36 sq ft damper section.
3. Manufacturers:
    a. As determined by Temperature Controls Contractor..
    b. Voltage.
        1) 24VACDC
    c. Substitutions: See Section 016000 - Product Requirements.

2.7 INPUT/OUTPUT SENSORS

A. Temperature Sensors:

1. Use thermistor or RTD type temperature sensing elements with characteristics resistant to moisture, vibration, and other conditions consistent with the application without affecting accuracy and life expectancy.
2. 100 ohm platinum RTD is acceptable if used with project DDC controllers.

3. Temperature sensing device must be compatible with project DDC controllers.
4. Performance Characteristics:
    a. RTD:
        1) Room Sensor Accuracy: Plus/minus 0.50 degrees F minimum.
        2) Duct Averaging Accuracy: Plus/minus 0.50 degrees F minimum.
        3) All Other Accuracy: Plus/minus 0.75 degrees F minimum.
        4) Range: Minus 40 degrees F through 220 degrees F minimum.
    b. Thermistor:
        1) Accuracy (All): Plus/minus 0.36 degrees F minimum.
        2) Range: Minus 25 degrees F through 122 degrees F minimum.
        3) Heat Dissipation Constant: 2.7 mW per degree C.
    c. Temperature Transmitter:
        1) Accuracy: 0.10 degree F minimum or plus/minus 0.20 percent of span.
        2) Output: 4 - 20 mA.
    d. Sensing Range:
        1) Provide limited range sensors if required to sense the range expected for a respective point.
        2) Use RTD type sensors for extended ranges beyond minus 30 degrees F to 230 degrees F.
        3) Use temperature transmitters in conjunction with RTD's when RTD's are incompatible with DDC controller direct temperature input.
    e. Wire Resistance:
        1) Use appropriate wire size to limit temperature offset due to wire resistance to 1.0 degree F or use temperature transmitter when offset is greater than 1.0 degree F due to wire resistance.
        2) Compensate for wire resistance in software input definition when feature is available in the DDC controller.
    f. Room Sensors: Locking coverwired or wireless..
    g. Outside Air Sensors: Watertight inlet fitting shielded from direct rays of the sun.
    h. Immersion Temperature Sensors: A sensor encased in a corrosion-resistant probe with an indoor junction box service entry body.
    i. Room Temperature Sensors with Integral Digital Display:
        1) Construct for surface or wall box.
        2) Provide a four button keypad with the following capabilities:
            (a) Indication of space and outdoor temperatures.
            (b) Setpoint adjustment to accommodate room setpoint and DDC Input/Output Points List.
            (c) Display and control fan operation status.
            (d) Manual occupancy override and indication of occupancy status.
            (e) Controller mode status.
    j. Temperature Averaging Elements:
        1) Use on duct sensors for ductwork 10 sq ft or larger.
        2) Use averaging elements where prone to stratification with sensor length 8 ft.
        3) Provide for all mixed air and heating coil discharge sensors regardless of duct size.
    k. Insertion Elements:
        1) Use in ducts not affected by temperature stratification or smaller than 11 sq inches.
        2) Provide dry type, insertion elements for liquids, installed in immersion wells, with minimum insertion length of 2.5 inches.

B. Static Pressure (Air Pressure) Sensors:

1. Unidirectional with ranges not exceeding 150 percent of maximum expected input.
2. Temperature compensate with typical thermal error or 0.06 percent of full scale in temperature range of 40 to 100 degrees F.
3. Accuracy: One percent of full scale with repeatability 0.3 percent.
4. Output: 0 - 5 vdc with power at 12 to 28 vdc.

C. Equipment Operation (Current) Sensors:

1. Status Inputs for Fans: Differential pressure switch with adjustable range of 0 to 5 inches wg.
2. Status Inputs for Pumps: Differential pressure switch piped across pump with adjustable pressure differential range of 8 to 60 psi.
3. Status Inputs for Electric Motors: Current sensing relay with current transformers, adjustable and set to 175 percent of rated motor current.

D. Damper Position Indication: Potentiometer mounted in enclosure with adjustable crank arm assembly connected to damper to transmit 0 - 100 percent damper travel.

E. Carbon Dioxide Sensors, Duct and Wall:

(a) Connection: 2-wire, RS-485, or Zigbee wireless protocol.

2. Air Temperature: Range of 32 to 122 degrees F.
3. Relative Humidity: Range of 0 to 95 percent (non-condensing).
4. Power Input: Class 2; 12 to 30VDC or 24VAC 50/60 Hz; 100mA max.
5. Calibration Characteristics:
   a. Automatically compensating algorithm for sensor drift due to sensor degradation.
   b. Maximum Drift: 2 percent.
   c. User calibratable with a minimum calibration interval of 5 years.
6. Construction:
   a. Sensor Chamber: Non-corrosive material for neutral effect on carbon dioxide sample.
   b. Provide duct mounted sensors with duct probe designed to protect sensing element from dust accumulation and mechanical damage.
   c. Housing: High impact plastic, UL 94 VO.
7. Optional Equipment
   a. Temperature Sensor:
      1) Solid state, integrated circuit; Accuracy: Plus/minus 1 degree F; Resolution: 0.2 degrees F; Output Range: 50 to 95 degrees F.

2.8 THERMOSTATS

A. Room Thermostat Accessories:

1. Thermostat Covers: Brushed aluminum.
2. Insulating Bases: For thermostats located on exterior walls.
3. Thermostat Guards: Locking transparent plastic mounted on separate base.

B. Outdoor Reset Thermostat:

1. Remote bulb or bimetal rod and tube type, proportioning action with adjustable throttling range, adjustable setpoint.
2. Scale range: -10 to 70 degrees F.

C. Immersion Thermostat:

1. Remote bulb or bimetallic rod and tube type, proportional action with adjustable setpoint and adjustable throttling range.

D. Airstream Thermostats:

1. Remote bulb or bimetallic rod and tube type, proportional action with adjustable setpoint in middle of range and adjustable throttling range.
2. Averaging service remote bulb element: 7.5 feet.

E. Electric Low Limit Duct Thermostat:

1. Snap acting, single pole, single throw, manual reset switch that trips if temperature sensed across any 12 inches of bulb length is equal to or below setpoint,
2. Bulb length: Minimum 20 feet.
3. Provide one thermostat for every 20 sq ft of coil surface.

F. Electric High Limit Duct Thermostat:

1. Snap acting, single pole, single throw, manual reset switch that trips if temperature sensed across any 12 inches of bulb length is equal to or above setpoint,
2. Bulb length: Minimum 20 feet.
3. Provide one thermostat for every 20 sq ft of coil surface.

2.9 TIME CLOCKS

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that systems are ready to receive work.

C. Beginning of installation means installer accepts existing conditions.

D. Sequence work to ensure installation of components is complementary to installation of similar components in other systems.

E. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.

F. Ensure installation of components is complementary to installation of similar components.

G. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Check and verify location of thermostats with plans and room details before installation. Locate 60 inches above floor. Align with lighting switches and humidistats. Refer to Section 262726.

C. Mount freeze protection thermostats using flanges and element holders.

D. Mount outdoor reset thermostats and outdoor sensors indoors, with sensing elements outdoors with sun shield.

E. Provide separable sockets for liquids and flanges for air bulb elements.

F. Provide guards on thermostats in entrances.

G. Provide valves with position indicators and with pilot positioners where sequenced with other controls.

H. Provide mixing dampers of opposed blade construction arranged to mix streams. Provide pilot positioners on mixed air damper motors.

I. Provide conduit and electrical wiring in accordance with Section 260583. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.

END OF SECTION

SECTION 230923 - BUILDING MANAGEMENT SYSTEM

PART 1 GENERAL

1.1 MECHANICAL GENERAL PROVISIONS

A. This contractor shall conform to the General and Supplementary Conditions Provisions under Division 1 of the Specifications.

B. This contractor shall conform to the Specifications Section 23 0000: Mechanical General Provisions.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Products Supplied But Not Installed Under This Section:

1. Control valves.
2. Motorized dampers.
3. Wells, sockets and other inline hardware for water sensors (temperature, pressure, flow).
4. Control damper actuators.
5. Airflow measuring stations.
6. Terminal unit controllers and actuators, when installed by terminal unit manufacturer.

B. Products Not Furnished or Installed But Integrated with the Work of this Section:

1. Boiler Control Systems.
2. Pump Control Packages.

C. Work Required Under Division 16 Related to This Section:

1. Power wiring to line side of motor starters, disconnects or variable frequency drives.
2. Provision and wiring of smoke detectors and other devices relating to fire alarm system.
3. Power meter monitoring system.
4. Campus LAN (Ethernet) connection adjacent to JACE network management controller.

1.3 SUMMARY

A. Scope: Furnish all labor, materials and equipment necessary for a complete and operating Building Management System (BMS), utilizing Direct Digital Controls as shown on the drawings and as described herein. Drawings are diagrammatic only. All controllers furnished in this section shall communicate on a peer-to-peer bus over a single BACnet open protocol bus, either wired in conduit (or as otherwise permitted herein) or wireless per Zigbee protocol.

1. The intent of this specification is to provide a system that is consistent with BMS systems throughout the owner’s facilities running the Tridium™ Framework.

2. System architecture shall fully support a multi-vendor environment and be able to integrate third party systems via existing vendor protocols including, as a minimum, BACnet, and Modbus. Non BACnet communication protocol for specific pieces of equipment must be approved on a case by case basis.
3. System architecture shall provide secure Web access using MS Internet Explorer from any computer on the owner's LAN.
4. All control devices furnished with this Section shall be programmable directly from the Tridium™ Workbench upon completion of this project. The use of configurable or programmable controllers that require additional software tools for post-installation maintenance shall not be acceptable.
5. Any control vendor that must provide additional BMS server software shall be unacceptable. Only systems that utilize the WEBs Tridium™ Framework shall satisfy the requirements of this section.
6. The BMS server shall host all graphic files for the control system. All graphics and navigation schemes for this project shall match those that are on the existing campus Tridium framework server
7. A laptop computer including engineering/programming software to modify Operating System Server BMS programs and graphics shall be included
8. OPEN NIC STATEMENTS - All Tridium NiagraAX software licenses shall have the following NiCS: "accept.station.in=*"; "accept.station.out=*"and "accept.wb.in=*"and "accept.wb.out=*". All open NIC statements shall follow Tridium Open NIC specifications
9. All JACE hardware products used on this project must be Made in the USA or come through the Tridium Richmond, VA shipping facility. JACE hardware products not meeting these requirements will not be allowed.
10. Approved Manufacturers: Alerton, Delta, Siemens, Johnson Controls.
11. Approved Installation Contractors: ATS, Electro Controls, Johnson Controls.

1.4 SUBMITTALS:

A. Submit documentation of contractor qualifications, including those indicated in paragraph 1.9 "Quality Assurance" if requested by the A-E.

B. PDF copies of shop drawings of the entire control system shall be submitted and shall consist of a complete list of equipment and materials, including manufacturers' catalog data sheets and installation instructions. Samples of written Controller Checkout Sheets and Performance Verification Procedures for applications similar in scope shall be included for approval.

C. Shop drawings shall also contain complete wiring and schematic diagrams, sequences of operation, control system bus layout and any other details required to demonstrate that the system has been coordinated and will properly function as a system. Terminal identification for all control wiring shall be shown on the shop drawings.

D. Upon completion of the work, provide eight complete sets of 'as-built' drawings and other project-specific documentation in 3-ring hard-backed binders and on compact disc.

E. Any deviations from these specifications or the work indicated on the drawings shall be clearly identified in the Submittals.

1.5 AGENCY AND CODE APPROVALS

A. All products of the BMS shall be provided with the following agency approvals. Verification that the approvals exist for all submitted products shall be provided on request, with the submittal package. Systems or products not currently offering the following approvals are not acceptable.

1. Federal Communications Commission (FCC), Rules and Regulations, Volume II -July 1986 Part 15 Class A Radio Frequency Devices
2. FCC, Part 15, Subpart J, Class A Computing Devices
3. UL 504 - Industrial Control Equipment
4. UL 506 - Specialty Transformers
5. UL 910 - Test Method for Fire and Smoke Characteristics of Electrical and Optical-Fiber Cables Used in Air-Handling Spaces
6. UL 916 - Energy Management Systems All
7. UL 1449 – Transient Voltage Suppression
8. Standard Test for Flame Propagation Height of Electrical and Optical - Fiber Cables Installed Vertically in Shafts
9. EIA/ANSI 232-E - Interface Between Data Technical Equipment and Data Circuit Terminal Equipment Employing Serial Binary Data Interchange
10. EIA 455 - Standard Test Procedures for Fiber Optic Fibers, Cables, Transducers, Connecting and Terminating Devices
11. IEEE C62.41- Surge Voltages in Low-Voltage AC Power Circuits
12. IEEE 142 - Recommended Practice for Grounding of Industrial and Commercial Power Systems
    a. 13. NEMA 250 - Enclosures for Electrical Equipment
        1) NEMA ICS 1 - Industrial Controls and Systems
        2) NEMA ST 1 - Specialty Transformers
        3) NCSBC Compliance, Energy: Performance of control system shall meet or surpass the requirements of ASHRAE/IESNA 90.1-1999.

1.6 SOFTWARE OWNERSHIP

A. The Owner shall have full ownership and full access rights for all network management, operating system server, engineering and programming software required for the ongoing maintenance and operation of the BMS.

1.7 DELIVERY, STORAGE AND HANDLING

A. Maintain integrity of shipping cartons for each piece of equipment and control device through shipping, storage, and handling as required to prevent equipment damage. Store equipment and materials inside and protected from weather.

1.8 JOB CONDITIONS

A. Cooperation with Other Trades: Coordinate the Work of this section with that of other sections to insure that the Work will be carried out in an orderly fashion. It shall be this Contractor's

responsibility to check the Contract Documents for possible conflicts between his Work and that of other crafts in equipment location, pipe, duct and conduit runs, electrical outlets and fixtures, air diffusers, and structural and architectural features.

1.9 QUALITY ASSURANCE

A. The manufacturer of the BMS digital controllers shall, if requested, provide documentation supporting compliance with ISO-9001 (Model for Quality Assurance in Design/Development, Production, Installation and Servicing).

B. The Control System Contractor shall have a full service DDC office within 50 miles of the job site. This office shall be staffed with applications engineers, software engineers and field technicians. This office shall maintain parts inventory and shall have all testing and diagnostic equipment necessary to support this Work, as well as staff trained in the use of this equipment.

C. Single Source Responsibility of Supplier: The Control System Contractor shall be responsible for the complete installation and proper operation of the control system. The Control System Contractor shall exclusively be in the regular and customary business of design, installation and service of computerized building management systems similar in size and complexity to the system specified. The Control System Contractor shall be the manufacturer of the primary DDC system components or shall have been the authorized representative for the primary DDC components manufacturer for at least 5 years. All control panels shall be assembled by the Control System Contractor in a UL-Certified 508A panel shop.

D. Equipment and Materials: Equipment and materials shall be cataloged products of manufacturers regularly engaged in the production and installation of HVAC control systems. Products shall be manufacturer's latest standard design and have been tested and proven in actual use.

1.10 SPECIFICATION NOMENCLATURE - ACRONYMS USED IN THIS SPECIFICATION ARE AS FOLLOWS:

A. Actuator: Control device that opens or closes valve or damper in response to control signal.

B. AI Analog Input

C. AO Analog Output

D. Analog Continuously variable state over stated range of values

E. BMS Building Management System

F. DDC Direct Digital Control

G. Discrete Binary or digital state

H. DI Discrete Input

I. DO Discrete Output

J. FC Fail Closed position of control device or actuator. Device moves to closed position on loss of control signal or energy source.

K. FO Fail open (position of control device or actuator). Device moves to open position on loss of control signal or energy source.

L. GUI Graphical User Interface

M. HVAC Heating, Ventilating and Air Conditioning

N. IDC Interoperable Digital Controller

O. ILC Interoperable Lon Controller

P. LAN Local Area Network

Q. Modulating Movement of a control device through an entire range of values, proportional to an infinitely variable input value.

R. Motorized Control device with actuator

S. NAC Network Area Controller

T. NC Normally closed position of switch after control signal is removed or normally closed position of manually operated valves or dampers.

U. NO Normally open position of switch after control signal is removed; or the open position of a controlled valve or damper after the control signal is removed; or the usual position of a manually operated valve.

V. OSS Operating System Server, host for system graphics, alarms, trends, etc.

W. Operator Same as actuator

X. PC Personal Computer

Y. Peer-to-Peer Mode of communication between controllers in which each device connected to network has equal status and each shares its database values with all other devices connected to network

Z. P Proportional control; control mode with continuous linear relationship between observed input signal and final controlled output element.

AA. PI Proportional-Integral control, control mode with continuous proportional output plus additional change in output based on both amount and duration of change in controller variable (reset control).

BB. PICS BACnet Product Interoperability Compliance Statement

CC. PID Proportional-Integral-Derivative control, control mode with continuous correction of final controller output element versus input signal based on proportional error, its time history (reset) and rate at which it's changing (derivative).

DD. Point Analog or discrete instrument with addressable database value

EE. WAN Wide Area Network

PART 2 MATERIALS

2.1 GENERAL

A. The Building Management System (BMS) shall be comprised of a network of interoperable, stand-alone digital controllers, a network area controller, graphics and programming, and other control devices for a complete system as specified herein.

B. The installed system shall provide secure password access to all features, functions and data contained in the overall BMS.

C. The control system shall be either wired in conduit, or wireless mesh design with Zigbee WiFi protocol.

D. The system shall include a building energy usage and setpoint/conditions display at the building entrance. Display shall include the following:

1. A color floor plan with zone temperatures and CO2 levels.
2. Current outdoor air temperature.
3. Day and time.
4. Current and current month building electrical energy power and consumption.
5. Current and current month boiler BTU heat output.
6. Current and current month building gas usage.
7. Current and current month building hot water flow.
8. Current and current month building domestic water usage.

2.2 OPEN, INTEROPERABLE, INTEGRATED ARCHITECTURE

A. The intent of this specification is to provide a peer-to-peer networked, stand-alone, distributed control system utilizing the BACnet technology communication protocol in one open, interoperable system.

B. The supplied computer software shall employ object-oriented technology (OOT) for representation of all data and control devices within the system. Physical connection of any BACnet control equipment, such as chillers, shall be via Ethernet.

C. All components and controllers supplied under this contract shall be true "peer-to-peer" communicating devices. Components or controllers requiring "polling" by a host to pass data shall not be acceptable.

D. All components and controllers supplied under this contract shall be true “peer-to-peer” communicating devices. Components or controllers requiring “polling” by a host to pass data shall not be acceptable.

E. The supplied system must incorporate the ability to access all data using Java enabled browsers without requiring proprietary operator interface and configuration programs. An Open Database Connectivity (ODBC) or Structured Query Language (SQL) compliant server database is required for all system database parameter storage. This data shall reside on the existing Operating System Server currently located in the Facilities Office on the LAN. Systems requiring proprietary database and user interface programs shall not be acceptable.

F. A hierarchical topology is required to assure reasonable system response times and to manage the flow and sharing of data without unduly burdening the customer’s internal Intranet network. Systems employing a “flat” single tiered architecture shall not be acceptable.

1. Maximum acceptable response time from any alarm occurrence (at the point of origin) to the point of annunciation shall not exceed 5 seconds for network connected user interfaces.
2. Maximum acceptable response time from any alarm occurrence (at the point of origin) to the point of annunciation shall not exceed 60 seconds for remote or dial-up connected user interfaces.

2.3 BAS SERVER HARDWARE

A. Minimum Computer Configuration (Hardware Independent)

1. Central Server. Owner shall provide a dedicated BAS server with configuration that includes the following components as a minimum:
2. IBM based computer compatible with OS.
3. Minimum 1 terabyte hard disk. Video display 1024 x 768, 24-bit true color minimum. 3.0 USB port for backup. 19” Minimum flat screen display. Keyboard and mouse.
4. Operating system for the server shall be Microsoft Windows 7 Pro or Windows 10 Pro.
5. Provide IP for web connection.
6. Standard Client: The thin-client Web Browser BAS GUI shall be Microsoft Internet Explorer (8.0 or later) running on Microsoft 7 or 10. No special software shall be required to be installed on the PCs used to access the BAS via a web browser.

2.4 SYSTEM NETWORK CONTROLLER (SNC)

A. These controllers are designed to manage communications between the programmable equipment controllers (PEC), application specific controllers (ASC), and advanced unitary controllers (AUC) which are connected to its communications trunks, manage communications between itself and other system network controllers (SNC) and with any operator workstations (OWS) that are part of the BAS, and perform control and operating strategies for the system based on information from any controller connected to the BAS.

B. The controllers must be fully programmable to meet the unique requirements of the facility it must control.

C. The controllers must be capable of peer-to-peer communications with other SNC's and with any OWS connected to the BAS, whether the OWS is directly connected, connected via modem or connected via the Internet.

D. The communication protocols utilized for peer-to-peer communications between SNC's will be Tridium, BACnet TCP/IP and SNMP. Use of a proprietary communication protocol for peer-to-peer communications between SNC's is not allowed.

E. The SNC shall be capable of executing application control programs to provide:

1. Calendar functions
2. Scheduling
3. Trending
4. Alarm monitoring and routing
5. Time synchronization
6. Integration of BACnet, and ModBus controller data
7. Network management functions for all SNC, PEC and ASC based devices
8. The SNC must provide the following hardware features as a minimum:
    a. One Ethernet Port-10/100 Mdps
    b. One RS-232/485 port
    c. One BACnet Interface Port
    d. Battery Backup
    e. Flash memory for long term data backup (If battery backup or flash memory is not supplied, the controller must contain a hard disk with at least 1 gigabyte storage capacity)
9. The SNC shall support standard Web browser access via the Intranet/Internet. It shall support a minimum of 16 simultaneous users.
10. The SNC shall provide alarm recognition, storage, routing, management and analysis to supplement distributed capabilities of equipment or application specific controllers.
11. The SNC shall be able to route any alarm condition to any defined user location whether connected to a local network or remote via dial-up, telephone connection, or wide-area network.
    a. Alarm generation shall be selectable for annunciation type and acknowledgement requirements including but not limited to:
        1) Alarm,
        2) Return to normal,
        3) To default.
        4) Alarms shall be annunciated in any of the following manners as defined by the user:
            (a) Screen message text,
            (b) Email of complete alarm message to multiple recipients.
            (c) Pagers via paging services that initiate a page on receipt of email message.
            (d) Graphics with flashing alarm object(s).
        5) The following shall be recorded by the SNC for each alarm (at a minimum):
            (a) Time and date
            (b) Equipment (air handler #, accessway, etc.)
            (c) Acknowledge time, date, and user who issued acknowledgement.

12. Programming software and all controller “Setup Wizards” shall be embedded into the SNC.

2.5 PROGRAMMABLE EQUIPMENT CONTROLLER (PEC)

A. HVAC control shall be accomplished using BACnet based devices where the application has a BACnet profile defined. For each BACnet device that does not have BACnet certification, the device supplier must provide an XIF file for the device. The controller platform shall provide options and advanced system functions, programmable and configurable using Tridium Framework™, that allow standard and customizable control solutions required in executing the “Sequence of Operation”.

B. All PECs shall be application programmable and shall at all times maintain their BACnet certification. All control sequences within or programmed into the ILC shall be stored in non-volatile memory, which is not dependent upon the presence of a battery to be retained.

C. The PECs shall communicate with the SNC at a baud rate of not less than 78.8K baud. The PEC shall provide LED indication of communication and controller performance to the technician, without cover removal.

D. The following integral and remote Inputs/Outputs shall be supported per each PEC:

1. Eight integral dry contact digital inputs.
2. Any two digital inputs may be configured as pulse counters with a maximum pulse read rate of 15 Hz.
3. Eight integral analog inputs (configurable as 0-10V, 0-10,000 ohm or, 20K NTC).
4. Six integral 4-20 ma analog outputs.
5. Eight integral 24 Vac Triac digital outputs, configurable as maintained or floating motor control outputs.
6. One integral 20 Vdc, 65-mA power supply for auxiliary devices.
7. If a 20 Vdc 65-mA power supply terminal is not integral to the ILC, provide at each PEC a separate, fully isolated, enclosed, current limited and regulated UL listed auxiliary power supply for power to auxiliary devices
8. Each PEC shall have expansion ability to support additional I/O requirements through the use of remote input/output modules
9. PEC Controllers shall support the following control techniques:
    a. Ten configurable general-purpose control loops that can incorporate Demand Limit Control strategies, Setpoint reset, adaptive intelligent recovery, and time of day bypass.
    b. Ten general-purpose, non-linear control loops.
    c. Eight start/stop Loops.
    d. Thirty-two If/Then/Else logic loops.
    e. Thirty six Math Function loops (MIN, MAX, AVG, SUM, SUB,SQRT, MUL, DIV, ENTHALPY).

2.6 ADVANCED UNITARY CONTROLLER

A. The advanced unitary controller (AUC) platform shall be designed specifically to control HVAC – ventilation, filtration, heating, cooling, humidification, and distribution. Equipment includes: constant volume air handlers, VAV air handlers, packaged RTU, heat pumps, unit vents, fan coils, natural convection units, and radiant panels. The controller platform shall provide options and advanced system functions, programmable and configurable using Tridium Framework™, that allow standard and customizable control solutions required in executing the “Sequence of Operation”.

B. Minimum Requirements:

1. The controller shall be fully programmable with full functionality on any Tridium brand platform.
    a. Support downloads to the controller from any brand of Tridium platform.
    b. Support uploads from the controller to any brand of Tridium platform.
    c. Support simulation/debug mode of the controller.
    d. Maintain native GUI.
    e. Native function-block programming within the Tridium environment.
        1) The controller shall be capable of either integrating with other devices or stand-alone operation.
        2) The controller shall have two microprocessors. The Host processor contains on-chip FLASH program memory, FLASH information memory, and RAM to run the main HVAC application. The second processor for network communications. Controller memory minimum requirements include:
            (a) FLASH Memory Capacity: 60 Kilobytes with 8 Kilobytes for application program.
            (b) FLASH Memory settings retained for ten years.
            (c) RAM: 2 Kilobytes
        3) The controller shall have an FTT transformer-coupled communications port interface for common mode-noise rejection and DC isolation.
        4) The controller shall have an internal time clock with the ability to automatically revert from a master time clock on failure.
            (a) Operating Range: 24 hour, 365 day, multi-year calendar including day of week and configuration for automatic day-light savings time adjustment to occur on configured start and stop dates.
            (b) Accuracy: ±1 minute per month at 77° F (25° C).
            (c) Power Failure Backup: 24 hours at 32° to 122° F (0° to 50° C).
        5) The controller shall have Significant Event Notification, Periodic Update capability, and Failure Detect when network inputs fail to be detected within their configurable time frame.
        6) The controller shall have an internal DC power supply to power external sensors.
            (a) Power Output: 20 VDC ±10% at 75 mA.
        7) The controller shall have a visual indication (LED) of the status of the devise:
            (a) Controller operating normally.
            (b) Controller in process of download.
            (c) Controller in manual mode under control of software tool.
            (d) Controller lost its configuration.
            (e) No power to controller, low voltage, or controller damage.

(f) Processor and/or controller are not operating.

8) The minimum controller Environmental ratings
   (a) Operating Temperature Ambient Rating: -40° to 150° F (-40° to 65.5° C).
   (b) Storage Temperature Ambient Rating: -40° to 150° F (-40° to 65.5° C).
   (c) Relative Humidity: 5% to 95% non-condensing.
9) The controller shall have the additional approval requirements, listings, and approvals:
   (a) UL/cUL (E87741) listed under UL916 (Standard for Open Energy Management Equipment) with plenum rating.
   (b) CSA (LR95329-3) Listed
   (c) Meets FCC Part 15, Subpart B, Class B (radiated emissions) requirements.
   (d) Meets Canadian standard C108.8 (radiated emissions).
   (e) Conforms requirements European Consortium standard EN 61000-6-1; 2001 (EU Immunity)
   (f) Conforms requirements European Consortium standard EN 61000-6-3; 2001 (EU Emission)
10) The controller housing shall be UL plenum rated mounting to either a panel or DIN rail (standard EN50022; 7.5mm x 35mm).
11) The controller shall have a mix of digital inputs (DI), digital Triac outputs (DO), analog outputs (AO), and universal inputs (UI).
   (a) Analog outputs (AO) shall be capable of being configured as digital outputs (DO)
   (b) Input and Output wiring terminal strips shall be removable from the controller without disconnecting wiring.
   (c) Input and Output wiring terminals shall be designated with color coded labels.
   (d) Universal inputs shall be capable of being configured as binary inputs, resistive inputs, voltage inputs (0-10 VDC), or current inputs (4-20 mA)
12) The controller shall provide for “user defined” Network Variables (NV) for customized configurations and naming using Tridium Framework™.
   (a) The controller shall support 62 Network Variables with a byte count of 31 per variable.
   (b) The controller shall support 1,922 separate data values.
13) The controller shall provide “continuous” automated loop tuning with an Adaptive Integral Algorithm Control Loop.
14) The controller platform shall have standard HVAC application programs that are modifiable to support both the traditional and specialized “sequence of operations” as outlined in Section 4.
   (a) Discharge air control and low limit
   (b) Pressure-dependent dual duct without flow mixing.
   (c) Variable air volume with return flow tracking.
   (d) Economizer with differential enthalpy.
   (e) Minimum airflow coordinated with CO2.
   (f) Unit ventilator cycle (1,2,3) 2-pipe with face/bypass.

2.7 OTHER CONTROL SYSTEM HARDWARE

A. Building energy usage display to be wall mounted at building entrance. Display shall be 42" LCD with interface to BMS system.

B. Thermostat/Sensor lockable covers. Lockable clear, ventilated plastic covers shall be provided and installed in all public and common areas. Lockable wire mesh covers with rounded edges shall be provided in gymnasiums.

C. Motorized control dampers that will not be integral to the equipment shall be furnished by the Control System Contractor. Control damper frames shall be constructed of galvanized steel, formed into changes and welded or riveted. Dampers shall be galvanized, with nylon bearings. Blade edge seals shall be vinyl. Blade edge and tip seals shall be included for all dampers. Blades shall be 16-gauge minimum and 6 inches wide maximum and frame shall be of welded channel iron. Damper leakage shall not exceed 10 CFM per square foot, at 1.5-inches water gauge static pressure.

D. Control damper actuators shall be furnished by the Control System Contractor. Two-position or proportional electric actuators shall be direct-mount type sized to provide a minimum of 5 in-lb torque per square foot of damper area. Damper actuators shall be spring return type. Operators shall be heavy-duty electronic type for positioning automatic dampers in response to a control signal. Motor shall be of sufficient size to operate damper positively and smoothly to obtain correct sequence as indicated. All applications requiring proportional operation shall utilize truly proportional electric actuators.

E. Control Valves: Control valves shall be 2-way or 3-way pattern as scheduled on the plans and constructed for tight shutoff at the pump shut-off head. Control valves shall operate satisfactorily against system pressures and differentials. Proportional control valves shall be sized for a maximum pressure drop of 5.0 psi at rated flow (unless otherwise noted or scheduled on the drawings). Valves with sizes up to and including 2 inches shall be “screwed” configuration and 2-1/2 inch and larger valves shall be “flanged” configuration. All control valves, including terminal unit valves, less than 2 inch shall be globe valves. Electrically-actuated control valves shall include spring return type actuators sized for tight shut-off against system pressures (as specified above) and, when specified, shall be furnished with integral switches for indication of valve position (open-closed). Pneumatic actuators for valves, when utilized, shall be sized for tight shut-off against system pressures (as specified above).

F. Wall Mount Room Temperature sensors: Each room temperature sensor shall provide temperature indication to the digital controller, provide the capability for a software-limited occupant set point adjustment (warmer-cooler slider bar or switch) and limited operation override capability. Room Temperature Sensors shall be 20,000-ohm thermistor type with a temperature range of -40 to 140 degrees F. The sensor shall be complete with a decorative cover and suitable for mounting over a standard electrical utility box, or wireless per Zigbee protocol. These devices shall have an accuracy of 0.5 degrees, F., over the entire range.

G. Duct-mounted and Outside Air Temperature Sensors: 20,000-ohm thermistor temperature sensors with an accuracy of ± 0.2ºC. Outside air sensors shall include an integral sun shield. Duct-mounted sensors shall have an insertion measuring probe of a length appropriate for the

duct size, with a temperature range of -40 to 160 degrees F. The sensor shall include a utility box and a gasket to prevent air leakage and vibration noise. For all mixed air and preheat air applications, install bendable averaging duct sensors with a minimum 8 - foot long sensor element. These devices shall have accuracy of 0.5 degrees, F., over the entire range.

H. Carbon Dioxide Sensors (CO2): Sensors shall utilize Non-dispersive infrared technology (N.D.I.R.), repeatable to plus or minus 20 PPM. Sensor range shall be 0 - 2000 PPM. Accuracy shall be plus or minus five percent (5%) or 75 PPM, whichever is greater. Response shall be less than one minute. Input voltage shall be 20 to 30 VAC or DC. Output shall be 0 - 10 VDC. Sensor shall be wall or duct mounted type, as appropriate for the application, housed in a high impact plastic enclosure. Sensors shall be either wired or wireless per Zigbee protocol.

I. Current Sensitive Switches: Solid state, split core current switch that operates when the current level (sensed by the internal current transformer) exceeds the adjustable trip point. Current switch to include an integral LED for indication of trip condition and a current level below trip set point.

J. Temperature Control Panels: Furnish temperature control panels of code gauge steel with locking doors for mounting all devices as shown. All electrical devices within a control panel shall be factory wired. Control panel shall be assembled by the BMS in a UL-Certified 508A panel shop. A complete set of ‘as-built’ control drawings (relating to the controls within that panel) shall be furnished within each control panel.

K. Pipe and Duct Temperature sensing elements: 20,000-ohm thermister temperature sensors with and accuracy of ±1% accuracy. Their range shall be -5- to 250 deg. F. Limited range sensors shall be acceptable provided they are capable of sensing the range expected for the point at the specified accuracy. Thermal wells with heat conductive gel shall be included.

L. Low Air Temperature Sensors: Provide SPST type switch, with 15 to 55 degrees F., range, vapor-charged temperature sensor. Honeywell model L482A, or approved equivalent.

M. Relays: Start/stop relay model shall provide either momentary or maintained switching action as appropriate for the motor being started. All relays shall be plugged in, interchangeable, mounted on a subbase and wired to numbered terminals strips. Relays installed in panels shall all be DPDT with indicating lamp. Relays installed outside of controlled devices shall be enclosed in a NEMA enclosure suitable for the location. Relays shall be labeled with UR symbol. RIB-style relays are acceptable for remote enable/disable.

N. Emergency Stop Switches: Provide toggle-type switch with normally-closed contact. Switch shall be labeled “AIR HANDLER EMERGENCY SHUTOFF, NORMAL - OFF.”.

O. Transducers: Differential pressure transducers shall be electronic with a 4-20 mA. output signal compatible to the Direct Digital Controller. Wetted parts shall be stainless steel. Unit shall be designed to operate in the pressure ranges involved.

P. Control Power Transformers: Provide step-down transformers for all DDC controllers and devices as required. Transformers shall be sized for the load, but shall be sized for 50 watts, minimum. Transformers shall be UL listed Class 2 type, for 120VAC/24VAC operation.

Q. Line voltage protection: All DDC system control panels that are powered by 120 VAC circuits shall be provided with surge protection. This protection is in addition to any internal protection provided by the manufacturer. The protection shall meet UL, ULC 1449, IEEE C62.41B. A grounding conductor, (minimum 12 AWG), shall be brought to each control panel.

PART 3 BAS SERVER & WEB BROWSER GUI

3.1 SYSTEM OVERVIEW

A. The BAS Contractor shall provide system software based on server/thin-client architecture, designed around the open standards of web technology. The BAS server shall communicate using Ethernet and TCP. Server shall be accessed using a web browser over Owner intranet and remotely over the Internet.

B. The intent of the thin-client architecture is to provide the operator(s) complete access to the BAS system via a web browser. The thin-client web browser Graphical User Interface (GUI) shall be browser and operating system agnostic, meaning it will support Microsoft and Netscape Navigator browsers (6.0 or later versions), and Windows as well as non-Window operating systems. No special software, other than free public domain programs such as “JAVA VIRTUAL MACHINE” shall be required to be installed on PC’s used to access the BAS via a web browser.

C. The BAS server software must support at least the following server platforms (Windows, and/or Linux). The BAS server software shall be developed and tested by the manufacturer of the system stand-alone controllers and network controllers/routers.

D. The web browser GUI shall provide a completely interactive user interface and must offer and be configured with the following features as a minimum:

1. Trending
2. Scheduling
3. Electrical demand limiting
4. Duty Cycling
5. Downloading Memory to field devices
6. Real time ’live’ Graphic Programs
7. Tree Navigation
8. Parameter change of properties
9. Setpoint Adjustments
10. Alarm / Event information
11. Configuration of operators
12. Execution of global commands
13. Add, delete, and modify graphics and displayed data
14. Software Components: All software shall be the most current version. All software components of the BAS system software shall be provided and installed as part of this project .BAS software components shall include:
    a. Server Software, Database and Web Browser Graphical User Interface
    b. System Configuration Utilities for future modifications to the system, and controllers.

c. Graphical Programming Tools
d. Direct Digital Control software
e. Application Software
f. Any required third party software
g. If licensing credits are required provide a minimum of 10% additional to as built control system requires.

15. BAS Server Database: The BAS server software shall utilize a Java DataBase Connectivity (JDBC) compatible database such as: MS SQL 8.0, Oracle 8i or IBM DB2. BAS systems written to Non -Standard and/or Proprietary databases are NOT acceptable.
16. Database Open Connectivity: The BAS server database shall allow real time access of data via the following standard mechanisms:
    a. Open protocol standard like SOAP
    b. OLE/OPC (for Microsoft Client's/Server platform only)
    c. Import/Export of the database from or to XML (eXtensible Mark-up Language)
17. Communication Protocol(s): The native protocol for the BAS server software shall be TCPIP over Ethernet. Proprietary protocols over TCP/IP are NOT acceptable.
18. Thin Client – Web Browser Based: The GUI shall be thin client or browser based and shall meet the following criteria:
    a. Web Browser's for PC's: Only a 5.5 or later browser (Explorer/Navigator) will be required as the GUI, and a valid connection to the server network. No installation of any custom software shall be required on the operator's GUI workstation/client. Connection shall be over an intranet or the Internet.
    b. Secure Socket Layers: Communication between the Web Browser GUI and BAS server shall offer encryption using 128-bit encryption technology within Secure Socket Layers (SSL). Communication protocol shall be Hyper-Text Transfer Protocol (HTTP)

3.2 WEB BROWSER GRAPHICAL USER INTERFACE

A. Web Browser Navigation: The Thin Client web browser GUI shall provide a comprehensive user interface. Using a collection of web pages, it shall be constructed to "feel" like a single application, and provide a complete and intuitive mouse/menu driven operator interface. It shall be possible to navigate through the system using a web browser to accomplish requirements of this specification. The Web Browser GUI shall (as a minimum) provide for navigation, and for display of animated graphics, schedules, alarms/events, live graphic programs, active graphic setpoint controls, configuration menus for operator access, reports, and reporting actions for events.

B. Login: On launching the web browser and selecting the appropriate domain name or IP address, the operator shall be presented with a login page that will require a login name and password. Navigation in the system shall be dependent on the operator's role privileges, and geographic area of responsibility.

C. Navigation: Navigation through the GUI shall be accomplished by clicking on appropriate level of a navigation tree (consisting of expandable and collapsible tree control like Microsoft's Explorer program), and/or by selecting dynamic links to other system graphics. Both the navigation tree and action pane shall be displayed simultaneously, enabling the operator to select a specific system or equipment, and view the corresponding graphic. The navigation tree

shall as a minimum provide the following views: Geographic, Network, Groups and Configuration.

1. Geographic View shall display a logical geographic hierarchy of the system including: cities, sites, buildings, building systems, floors, equipment and objects.
2. Groups View shall display Scheduled Groups and custom reports.
3. Configuration View shall display all the configuration categories (Operators, Schedule, Event, Reporting and Roles).
4. Action Pane: The Action Pane shall provide several functional views for each HVAC or mechanical/electrical subsystem specified. A functional view shall be accessed by clicking on the corresponding button:
    a. Graphics: Using graphical format suitable for display in a web browser, graphics shall include aerial building/campus views, color building floor-plans, equipment drawings, active graphic setpoint controls, web content, and other valid HTML elements. The data on each graphic page shall automatically refresh.
    b. Properties: Shall include graphic controls and text for the following: Locking or overriding objects, demand strategies, and any other valid data required for setup. Changes made to the properties pages shall require the operator to depress an ‘accept/cancel’ button.
    c. Schedules: Shall be used to create, modify/edit and view schedules based on the systems geographical hierarchy (using the navigation tree).
    d. Alarms: Shall be used to view alarm information geographically (using the navigation tree), acknowledge alarms, sort alarms by category, actions and verify reporting actions.
    e. Trends: Shall be used to display associated trend and historical data, modify colors, date range, axis and scaling
    f. Logic - Live Graphic Programs: Shall be used to display’ live’ graphic programs of the control algorithm, (micro block programming) for the mechanical/electrical system selected in the navigation tree.
    g. Other actions such as Print, Help, Command, and Logout shall be available via a drop-down window.
5. Color Graphics: The Web Browser GUI shall make extensive use of color in the graphic pane to communicate information related to setpoints and comfort. Animated .gifs or .jpg, vector scalable, active setpoint graphic controls shall be used to enhance usability. Graphics tools used to create Web Browser graphics shall be non-proprietary and conform to the following basic criteria:
    a. Display Size: The GUI workstation software shall graphically display in 1024 by 768 pixels 24 bit True Color.
    b. General Graphic: General area maps shall show locations of controlled buildings in relation to local landmarks.
    c. Color Floor Plans: Floor plan graphics shall show heating and cooling zones throughout the buildings in a range of colors, as selected by Owner. Provide a visual display of temperature relative to their respective setpoints. The colors shall be updated dynamically as a zone's actual comfort condition changes.
    d. Mechanical Components: Mechanical system graphics shall show the type of mechanical system components serving any zone through the use of a pictorial representation of components. Selected I/O points being controlled or monitored for each piece of equipment shall be displayed with the appropriate engineering units. Animation shall be used for rotation or moving mechanical components to enhance usability.

e. Minimum System Color Graphics: Color graphics shall be selected and displayed via a web browser for the following:
   1) Each piece of equipment monitored or controlled including each terminal unit
   2) Each building
   3) Each floor and zone controlled

6. Hierarchical Schedules: Utilizing the Navigation Tree displayed in the web browser GUI, an operator (with password access) shall be able to define a Normal, Holiday or Override schedule for an individual piece of equipment or room, or choose to apply a hierarchical schedule to the entire system, site or floor area. For example, Independence Day 'Holiday' for every level in the system would be created by clicking at the top of the geographic hierarchy defined in the Navigation Tree. No further operator intervention would be required and every control module in the system with would be automatically downloaded with the 'Independence Day' Holiday. All schedules that affect the system/area/equipment highlighted in the Navigation Tree shall be shown in a summary schedule table and graph.
   a. Schedules: Schedules shall comply with the BACnet standards, (Schedule Object, Calendar Object, Weekly Schedule property and Exception Schedule property) and shall allow events to be scheduled based on:
      1) Types of schedule shall be Normal, Holiday or Override
      2) A specific date,
      3) A range of dates,
      4) Any combination of Month of Year (1-12, any), Week of Month (1-5, last, any), Day of Week (M-Sun, Any)
      5) Wildcard (example, allow combinations like second Tuesday of every month).
      6) Schedule Categories: The system shall allow operators to define and edit scheduling categories (different types of "things" to be scheduled; for example, lighting, HVAC occupancy, etc.). The categories shall include: name, description, icon (to display in the hierarchy tree when icon option is selected) and type of value to be scheduled.
      7) Schedule Groups: In addition to hierarchical scheduling, operators shall be able to define functional Schedule Groups, comprised of an arbitrary group of areas/rooms/equipment scattered throughout the facility and site. For example, the operator shall be able to define an 'individual tenant' group – who may occupy different areas within a building or buildings. Schedules applied to the 'tenant group' shall automatically be downloaded to control modules affecting spaces occupied by the 'tenant group'
      8) Intelligent Scheduling: The control system shall be intelligent enough to automatically turn on any supporting equipment needed to control the environment in an occupied space. If the operator schedules an individual room in a VAV system for occupancy, for example, the control logic shall automatically turn on the VAV air handling unit, chiller, boiler, and/or any other equipment required to maintain the specified comfort and environmental conditions within the room.
      9) Partial Day Exceptions: Schedule events shall be able to accommodate a time range specified by the operator (ex: board meeting from 6 pm to 9 pm overrides Normal schedule for conference room).
      10) Schedule Summary Graph: The schedule summary graph shall clearly show Normal versus Holiday versus Override Schedules, and the net operating

schedule that results from all contributing schedules. Note: In case of priority conflict between schedules at the different geographic hierarchy, the schedule for the more detailed geographic level shall apply.

7. Alarms: Alarms associated with a specific system, area, or equipment selected in the Navigation Tree, shall be displayed in the Action Pane by selecting an 'Alarms' view. Alarms, and reporting actions shall have the following capabilities:
   a. Alarms View: Each Alarm shall display an Alarms Category (using a different icon for each alarm category), date/time of occurrence, current status, alarm report, and a bold URL link to the associated graphic for the selected system, area or equipment. The URL link shall indicate the system location, address and other pertinent information. An operator shall easily be able to sort events, edit event templates and categories, acknowledge or force a return to normal in the Events View as specified in this section.
   b. Alarm Categories: The operator shall be able to create, edit or delete alarm categories such as HVAC, Maintenance, Fire, or Generator. An icon shall be associated with each alarm category, enabling the operator to easily sort through multiple events displayed.
   c. Alarm Templates: Alarm template shall define different types of alarms and their associated properties. As a minimum, properties shall include a reference name, verbose description, severity of alarm, acknowledgement requirements, and high/low limit and out of range information.
   d. Alarm Areas: Alarm Areas enable an operator to assign specific Alarm Categories to specific Alarm Reporting Actions. For example, it shall be possible for an operator to assign all HVAC Maintenance Alarm on the 1st floor of a building to email the technician responsible for maintenance. The Navigation Tree shall be used to setup Alarm Areas in the Graphic Pane.
   e. Alarm Time/Date Stamp: All events shall be generated at the DDC control module level and comprise the Time/Date Stamp using the standalone control module time and date.
   f. Alarm Configuration: Operators shall be able to define the type of Alarm generated per object. A 'network' view of the Navigation Tree shall expose all objects and their respective Alarm Configuration. Configuration shall include assignment of Alarm, type of Acknowledgement and notification for return to normal or fault status.
   g. Alarm Summary Counter: The view of Alarm in the Graphic Pane shall provide a numeric counter, indicating how many Alarms are active (in alarm), require acknowledgement, and total number of Alarms in the BAS Server database.
   h. Alarm Auto-Deletion: Alarms that are acknowledged and closed shall be auto-deleted from the database and archived to a text file after an operator defined period.
   i. Alarm Reporting Actions: Alarm Reporting Actions specified shall be automatically launched (under certain conditions) after an Alarm is received by the BAS server software. Operators shall be able to easily define these Reporting Actions using the Navigation Tree and Graphic Pane through the web browser GUI. Reporting Actions shall be as follows:
      1) Print: Alarm information shall be printed to the BAS server's PC or a networked printer.
      2) Email: Email shall be sent via any POP3-compatible e-mail server (most Internet Service Providers use POP3). Email messages may be copied to several email accounts. Note: Email reporting action shall also be used to

support alphanumeric paging services, where email servers support pagers.

3) File Write: The ASCII File write reporting action shall enable the operator to append operator defined alarm information to any alarm through a text file. The alarm information that is written to the file shall be completely definable by the operator. The operator may enter text or attach other data point information (such as AHU discharge temperature and fan condition upon a high room temperature alarm).
4) Write Property: The write property reporting action updates a property value in a hardware module.
5) SNMP: The Simple Network Management Protocol (SNMP) reporting action sends an SNMP trap to a network in response to receiving an alarm.
6) Run External Program: The Run External Program reporting action launches specified program in response to an event.

8. Trends: Trends shall both be displayed and user configurable through the Web Browser GUI. Trends shall comprise analog, digital or calculated points simultaneously. A trend log's properties shall be editable using the Navigation Tree and Graphic Pane.
   a. Viewing Trends: The operator shall have the ability to view trends by using the Navigation Tree and selecting a Trends button in the Graphic Pane. The system shall allow y- and x-axis maximum ranges to be specified and shall be able to simultaneously graphically display multiple trends per graph.
   b. Local Trends: Trend data shall be collected locally by Multi-Equipment/Single Equipment general-purpose controllers, and periodically uploaded to the BAS server if historical trending is enabled for the object. Trend data, including run time hours and start time date shall be retained in non-volatile module memory. Systems that rely on a gateway/router to run trends are NOT acceptable.
   c. Resolution. Sample intervals shall be as small as one second. Each trended point will have the ability to be trended at a different trend interval. When multiple points are selected for displays that have different trend intervals, the system will automatically scale the axis.
   d. Dynamic Update. Trends shall be able to dynamically update at operator-defined intervals.
   e. Zoom/Pan. It shall be possible to zoom-in on a particular section of a trend for more detailed examination and 'pan through' historical data by simply scrolling the mouse.
   f. Numeric Value Display. It shall be possible to pick any sample on a trend and have the numerical value displayed.
   g. Copy/Paste. The operator must have the ability to pan through a historical trend and copy the data viewed to the clipboard using standard keystrokes (i.e. CTRL+C, CTRL+V).
9. Security Access: Systems that Security access from the web browser GUI to BAS server shall require a Login Name and Password. Access to different areas of the BAS system shall be defined in terms of Roles, Privileges and geographic area of responsibility as specified:
   a. Roles: Roles shall reflect the actual roles of different types of operators. Each role shall comprise a set of 'easily understood English language' privileges. Roles shall be defined in terms of View, Edit and Function Privileges.
      1) View Privileges shall comprise: Navigation, Network, and Configuration Trees, Operators, Roles and Privileges, Alarm/Event Template and Reporting Action.

2) Edit Privileges shall comprise: Setpoint, Tuning and Logic, Manual Override, and Point Assignment Parameters.
3) Function Privileges shall comprise: Alarm/Event Acknowledgement, Control Module Memory Download, Upload, Schedules, Schedule Groups, Manual Commands, Print, and Alarm/Event Maintenance.
4) Geographic Assignment of Roles: Roles shall be geographically assigned using a similar expandable/collapsible navigation tree. For example, it shall be possible to assign two HVAC Technicians with similar competencies (and the same operator defined HVAC Role) to different areas of the system.

3.3 GRAPHICAL PROGRAMMING

A. The system software shall include a Graphic Programming Language (GPL) for all DDC control algorithms resident in all control modules. Any system that does not use a drag and drop method of graphical icon programming shall not be accepted. All systems shall use a GPL is a method used to create a sequence of operations by assembling graphic microblocks that represent each of the commands or functions necessary to complete a control sequence. Microblocks represent common logical control devices used in conventional control systems, such as relays, switches, high signal selectors, etc., in addition to the more complex DDC and energy management strategies such as PID loops and optimum start. Each microblock shall be interactive and contain the programming necessary to execute the function of the device it represents.

B. Graphic programming shall be performed while on screen and using a mouse; each microblock shall be selected from a microblock library and assembled with other microblocks necessary to complete the specified sequence. Microblocks are then interconnected on screen using graphic "wires," each forming a logical connection. Once assembled, each logical grouping of microblocks and their interconnecting wires then forms a graphic function block which may be used to control any piece of equipment with a similar point configuration and sequence of operation.

C. Graphic Sequence: The clarity of the graphic sequence must be such that the operator has the ability to verify that system programming meets the specifications, without having to learn or interpret a manufacturer's unique programming language. The graphic programming must be self-documenting and provide the operator with an understandable and exact representation of each sequence of operation.

D. GPL Capabilities: The following is a minimum definition of the capabilities of the Graphic Programming software:

1. Function Block (FB): Shall be a collection of points, microblocks and wires which have been connected together for the specific purpose of controlling a piece of HVAC equipment or a single mechanical system.
2. Logical I/O: Input/Output points shall interface with the control modules in order to read various signals and/or values or to transmit signal or values to controlled devices.
3. Microblocks: Shall be software devices that are represented graphically and may be connected together to perform a specified sequence. A library of microblocks shall be submitted with the control contractors bid.

4. Wires: Shall be Graphical elements used to form logical connections between microblocks and between logical I/O.
5. Reference Labels: Labels shall be similar to wires in that they are used to form logical connections between two points. Labels shall form a connection by reference instead of a visual connection, i.e. two points labeled 'A' on a drawing are logically connected even though there is no wire between them.
6. Parameter: A parameter shall be a value that may be tied to the input of a microblock.
7. Properties: Dialog boxes shall appear after a microblock has been inserted which has editable parameters associated with it. Default parameter dialog boxes shall contain various editable and non-editable fields, and shall contain 'push buttons' for the purpose of selecting default parameter settings.
8. Icon: An icon shall be graphic representation of a software program. Each graphic microblock has an icon associated with it that graphically describes its function.
9. Menu-bar Icon: Shall be an icon that is displayed on the menu bar on the GPL screen, which represents its associated graphic microblock.
10. Live Graphical Programs: The Graphic Programming software must support a 'live' mode, where all input/output data, calculated data, and setpoints shall be displayed in a 'live' real-time mode.

3.4 BACNET NETWORK MANAGEMENT

A. Systems requiring the use of third party BACnet network management tools shall not be accepted.

B. Network management shall include the following services: device identification, device installation, device configuration, device diagnostics, device maintenance and network variable binding.

C. The Network configuration tool shall also provide diagnostics to identify devices on the network, to reset devices, and to view health and status counters within devices.

D. These tools shall provide the ability to "learn" an existing BACnet network, regardless of what network management tool(s) were used to install the existing network, so that existing BACnet devices and newly added devices are part of a single network management database.

E. The network management database shall be resident in the Network Area Controller (NAC), ensuring that anyone with proper authorization has access to the network management database at all times. Systems employing network management databases that are not resident, at all times, within the control system shall not be accepted.

3.5 PORTABLE OPERATOR'S TOOL (LAPTOP COMPUTER)

A. The laptop computer shall consist of an Intel Pentium based laptop computer (minimum processing speed of 2.0 GHz with 2 GB RAM and a 80-gigabyte minimum hard drive). It shall include a CD-ROM drive, and appropriate connectors and cables for communication with the Ethernet network.

PART 4 INSTALLATION

4.1 GENERAL

A. Install system and materials in accordance with manufacturer's instructions, and as detailed on the project drawing set.

B. Line and low voltage electrical connections to control equipment shown specified or shown on the control diagrams shall be furnished and installed by the Control System Contractor in accordance with these specifications.

C. Equipment furnished by the Mechanical Contractor that is normally wired before installation shall be furnished completely wired. Control wiring normally performed in the field will be furnished and installed by the Control System Contractor.

D. All control devices mounted on the face of control panels shall be clearly identified as to function and system served with permanently engraved phenolic labels.

E. Install locking thermostat/sensor covers in all common/public spaces.

4.2 WIRING

A. All electrical control wiring to the control panels shall be the responsibility of the Control System Contractor.

B. All wiring shall be in accordance with the Project Electrical Specifications (Division 26), the National Electrical Code and any applicable local codes. All exposed control wiring shall be installed in raceways/conduits. Control wiring in concealed spaces may be installed in raceways/conduits or may be plenum rated cable. When plenum rated cable is used the cables (as much as possible) shall be grouped and zip tied. Grouped cables may be ran along piping and duct supports but shall not impede access to mechanical equipment.

PART 5 PROJECT CLOSEOUT

5.1 ACCEPTANCE TESTING

A. Upon completion of the installation, the Control System Contractor shall load all system software and start-up the system. The Control System Contractor shall perform all necessary calibration, testing and de-bugging and perform all required operational checks to insure that the system is functioning in full accordance with these specifications.

B. The Control System Contractor shall perform tests to verify proper performance of components, routines, and points. Repeat tests until proper performance results. This testing shall include a point-by-point log to validate 100% of the input and output points of the DDC system operation.

C. System Acceptance: Satisfactory completion is when the Control System Contractor has performed successfully all the required testing to show performance compliance with the requirements of the Contract Documents to the satisfaction of the Owner's Representative.

System acceptance shall be contingent upon completion and review of all corrected deficiencies.

5.2 OPERATOR TRAINING

A. During system commissioning and at such time acceptable performance of the Control System hardware and software has been established, the Control System Contractor shall provide on-site operator instruction to the owner's operating personnel. Operator instruction shall be done during normal working hours and shall be performed by a competent representative familiar with the system hardware, software and accessories.

B. The Control System Contractor shall provide 40 hours of comprehensive training in two separate sessions (80 hours total) for system orientation, product maintenance and troubleshooting, programming and engineering, if not provided under a previous contract at the site using the same brand and type of controllers within the previous 3 years.

C. The Control System Contractor shall provide 16 hours (total) of instruction to the owner's designated personnel on the operation of the BMS and describe its intended use with respect to the programmed functions specified. Operator orientation of the BMS shall include, but not be limited to; the overall operation program, equipment functions (both individually and as part of the total integrated system), commands, systems generation, advisories, and appropriate operator intervention required in responding to the System's operation

5.3 WARRANTY PERIOD SERVICES

A. Equipment, materials and workmanship incorporated into the work shall be warranted for a period of one year from the time of system acceptance.

B. Within this period, upon notice by the Owner, any defects in the BMS due to faulty materials, methods of installation or workmanship shall be promptly repaired or replaced by the Control System Contractor at no expense to the Owner

C. Maintenance of Computer Software Programs: The Control System Contractor shall maintain all software during the warranty period. In addition, all factory or sub-vendor upgrades to software shall be added to the systems, when they become available, at no additional cost. New products are not considered upgrades in this context.

D. Maintenance of Control Hardware: The Control System Contractor shall inspect, repair, replace, adjust, and calibrate, as required, the controllers, control devices and associated peripheral units during the warranty period. The Control System Contractor shall then furnish a report describing the status of the equipment, problem areas (if any) noticed during service work, and description of the corrective actions taken. The report shall clearly certify that all software is functioning correctly.

E. Service Period: Calls for service by the Owner shall be honored within 24 hours and are not to be considered as part of routine maintenance.

F. Service Documentation: A copy of the service report associated with each owner-initiated service call shall be provided to the owner.

5.4 WARRANTY ACCESS

A. The Owner shall grant to the Control System Contractor reasonable access to the BMS during the warranty period. Remote access to the BMS (for the purpose of diagnostics and troubleshooting, via the Internet, during the warranty period) will be allowed.

5.5 OPERATION & MAINTENANCE MANUALS

A. See Division 1 for requirements. O&M manuals shall include the following elements, as a minimum:

1. As-built control drawings for all equipment.
2. As-built Network Communications Diagram.
3. General description and specifications for all components.
4. Completed Performance Verification sheets.
5. Completed Controller Checkout/Calibration Sheets.

END OF SECTION 23 0923

SECTION 231123 - FACILITY NATURAL-GAS PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Pipe, pipe fittings, valves, and connections for natural gas piping systems.

1.2 RELATED REQUIREMENTS

A. Section 078400 - Firestopping.

B. Section 230516 - Expansion Fittings and Loops for HVAC Piping.

C. Section 230548 - Vibration and Seismic Controls for HVAC.

D. Section 230553 - Identification for HVAC Piping and Equipment.

E. Section 312316 - Excavation.

F. Section 312316.13 - Trenching.

G. Section 312323 - Fill.

1.3 REFERENCE STANDARDS

A. ANSI Z21.18/CSA 6.3 - Gas Appliance Pressure Regulators 2019.

B. ANSI Z21.80/CSA 6.22 - Line Pressure Regulators 2011 (Addendum A, 2012).

C. ASME BPVC-IX - Qualification Standard for Welding, Brazing, and Fuzing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators - Welding Brazing and Fusing Qualifications 2019.

D. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300 2016.

E. ASME B31.1 - Power Piping 2018.

F. ASME B31.9 - Building Services Piping 2017.

G. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2018.

H. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.

I. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service 2019.

J. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements 2015.

K. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry Elements 2015.

L. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements 2015.

M. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements 2016.

N. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends 2010.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

C. Welder Certificate: Include welders certification of compliance with ASME BPVC-IX.

D. Shop Drawings: For non-penetrating rooftop supports, submit detailed layout developed for this project, with design calculations for loadings and spacings.

E. Project Record Documents: Record actual locations of valves.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with applicable codes.

B. Valves: Manufacturer's name and pressure rating marked on valve body.

C. Welding Materials and Procedures: Conform to ASME BPVC-IX and applicable state labor regulations.

D. Welder Qualifications: Certified in accordance with ASME BPVC-IX.

E. Identify pipe with marking including size, ASTM material classification, and ASTM specification.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

B. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.7 FIELD CONDITIONS

A. Do not install underground piping when bedding is wet or frozen.

PART 2 PRODUCTS

2.1 NATURAL GAS PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A53/A53M, Schedule 40 black.

1. Fittings: ASME B16.3, malleable iron, or ASTM A234/A234M, wrought steel welding type.
2. Joints: Threaded or welded to ASME B31.1.

2.2 FLANGES, UNIONS, AND COUPLINGS

A. Unions for Pipe Sizes 3 Inches and Under:

1. Ferrous pipe: Class 150 malleable iron threaded unions.

2.3 PIPE HANGERS AND SUPPORTS

A. Provide hangers and supports that comply with MSS SP-58.

1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
3. Trapeze Hangers: Welded steel channel frames attached to structure.
4. Vertical Pipe Support: Steel riser clamp.
5. Floor Supports: Concrete pier or steel pedestal with floor flange; fixture attachment.
6. Rooftop Supports for Low-Slope Roofs: Steel pedestals with bases that rest on top of roofing membrane, not requiring any attachment to the roof structure and not penetrating the roofing assembly, with support fixtures as specified; and as follows:
    a. Bases: High density polypropylene.
    b. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
    c. Steel Components: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.
    d. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports; corrosion resistant material.
    e. Height: Provide minimum clearance of 6 inches under pipe to top of roofing.

f. Manufacturers:
1) PHP Systems/Design: www.phpsd.com.
2) Substitutions: See Section 016000 - Product Requirements.

B. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:

1. Concrete Wedge Expansion Anchors: Complying with ICC-ES AC193.
2. Masonry Wedge Expansion Anchors: Complying with ICC-ES AC01.
3. Concrete Screw Type Anchors: Complying with ICC-ES AC193.
4. Masonry Screw Type Anchors: Complying with ICC-ES AC106.
5. Concrete Adhesive Type Anchors: Complying with ICC-ES AC308.
6. Other Types: As required.

2.4 BALL VALVES

A. Manufacturers:

1. Conbraco Industries, Inc: www.apollovalves.com.
2. Milwaukee Valve Company: www.milwaukeevalve.com.
3. Nibco, Inc: www.nibco.com.
4. Uponor, Inc.: www.uponorpro.com.
5. Substitutions: See Section 016000 - Product Requirements.

B. Construction, 4 Inches and Smaller: MSS SP-110, Class 150, 400 psi CWP, ductile iron body, 304 stainless steel ball, regular port, Teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, threaded ends with union.

2.5 LINE PRESSURE REGULATORS AND APPLIANCE REGULATORS INDICATORS

A. Manufacturers:

1. Actaris Metering Systems (A brand of ITT Controls): www.actaris-metering-systems.com.
2. Dungs Combustion Controls: www.dungs.com.
3. Maxitrol Company: www.maxitrol.com.
4. Substitutions: See Section 016000 - Product Requirements.

B. Compliance Requirements:

1. Appliance Regulator: ANSI Z21.18/CSA 6.3.
2. Line Pressure Regulator: ANSI Z21.80/CSA 6.22.

C. Materials in Contact With Gas:

1. Housing: Aluminum, steel (free of non-ferrous metals).
2. Seals and Diaphragms: NBR-based rubber.

PART 3 EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

D. Install piping to maintain headroom, conserve space, and not interfere with use of space.

E. Group piping whenever practical at common elevations.

F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Refer to Section 220516.

G. Provide access where valves and fittings are not exposed.

1. Coordinate size and location of access doors with Section 083100.

H. Provide support for utility meters in accordance with requirements of utility companies.

I. Excavate in accordance with Section 312316.

J. Backfill in accordance with Section 312323.

K. Install valves with stems upright or horizontal, not inverted.

L. Pipe vents from gas pressure reducing valves to outdoors and terminate in weather proof hood.

M. Sleeve pipes passing through partitions, walls and floors.

N. Inserts:

1. Provide inserts for placement in concrete formwork.
2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

O. Pipe Hangers and Supports:

1. Install in accordance with ASME B31.9.
2. Support horizontal piping as scheduled.
3. Place hangers within 12 inches of each horizontal elbow.
4. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
5. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
6. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
7. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
8. Provide hangers adjacent to motor driven equipment with vibration isolation; refer to Section 220548.

3.3 APPLICATION

A. Install unions downstream of valves and at equipment or apparatus connections.

B. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

C. Provide plug valves in natural gas systems for shut-off service.

3.4 SCHEDULES

A. Pipe Hanger Spacing:

1. Metal Piping:
   a. Pipe Size: 1/2 inches to 1-1/4 inches:
      1) Maximum Hanger Spacing: 6.5 ft.
      2) Hanger Rod Diameter: 3/8 inches.
   b. Pipe Size: 1-1/2 inches to 2 inches:
      1) Maximum Hanger Spacing: 10 ft.
      2) Hanger Rod Diameter: 3/8 inch.
   c. Pipe Size: 2-1/2 inches to 3 inches:
      1) Maximum Hanger Spacing: 10 ft.
      2) Hanger Rod Diameter: 1/2 inch.
   d. Pipe Size: 4 inches to 6 inches:
      1) Maximum Hanger Spacing: 10 ft.
      2) Hanger Rod Diameter: 5/8 inch.

END OF SECTION

SECTION 232213 - STEAM AND CONDENSATE HEATING PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Pipe and pipe fittings.

B. Pipe hangers and supports.

C. Steam piping system.

D. Steam condensate piping system.

1.2 RELATED REQUIREMENTS

A. Section 230553 - Identification for HVAC Piping and Equipment.

B. Section 230719 - HVAC Piping Insulation.

C. Section 232214 - Steam and Condensate Heating Specialties.

D. Section 232500 - HVAC Water Treatment: Pipe cleaning.

1.3 REFERENCE STANDARDS

A. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300 2016.

B. ASME B31.9 - Building Services Piping 2017.

C. ASME BPVC-IX - Qualification Standard for Welding, Brazing, and Fuzing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators - Welding Brazing and Fusing Qualifications 2019.

D. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2018.

E. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.

F. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service 2019.

G. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers 1992, with Editorial Revision (2018).

H. AWS D1.1/D1.1M - Structural Welding Code - Steel 2015, with Errata (2016).

I. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation 2018.

1.4 SYSTEM DESCRIPTION

A. When more than one piping system material is selected, ensure systems components are compatible and joined to ensure the integrity of the system is not jeopardized. Provide necessary joining fittings. Ensure flanges, unions, and couplings for servicing are consistently provided.

B. Use unions and flanges downstream of valves and at equipment or apparatus connections. Use dielectric unions where joining dissimilar materials. Do not use direct welded or threaded connections.

C. Provide pipe hangers and supports in accordance with ASME B31.9 or MSS SP-58 unless indicated otherwise.

D. Use gate valves for shut-off and to isolate equipment, part of systems, or vertical risers.

E. Use gate valves for throttling, bypass, or manual flow control services.

1.5 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on pipe materials, pipe fittings, valves and accessories. Provide manufacturers catalogue information. Indicate valve data and ratings.

C. Welders Certificate: Include welders certification of compliance with ASME BPVC-IX.

D. Manufacturer's Installation Instructions: Indicate hanging and support methods, joining procedures.

E. Project Record Documents: Record actual locations of valves.

F. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 016000 - Product Requirements, for additional provisions.
2. Valve Repacking Kits: One for each type and size of valve.

1.6 QUALITY ASSURANCE

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

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

C. Welder Qualifications: Certified in accordance with ASME BPVC-IX.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labelling in place. Inspect for damage.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

A. Conform to ASME B31.9and ASME B31.1 code for installation of piping system.

B. Provide certificate of compliance from Authority Having Jurisdiction indicating approval of welders.

C. Welding Materials and Procedures: Conform to ASME BPVC-IX and applicable state labor regulations.

2.2 LOW PRESSURE STEAM PIPING (15 PSIG MAXIMUM)

A. Steel Pipe: ASTM A53/A53M, Schedule 40, black.

1. Fittings: ASME B16.3 malleable iron Class 125, or ASTM A234/A234M wrought steel.
2. Joints: Threaded, or AWS D1.1/D1.1M welded.

2.3 LOW PRESSURE STEAM CONDENSATE PIPING

A. Steel Pipe: ASTM A53/A53M, Schedule 80, black.

1. Fittings: ASME B16.3 malleable iron Class 125, or ASTM A234/A234M wrought steel.
2. Joints: Threaded, or AWS D1.1/D1.1M welded.

2.4 PIPE HANGERS AND SUPPORTS

A. Provide hangers and supports that comply with MSS SP-58.

1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.

B. Hangers for Pipe Sizes 2 to 4 Inches: Carbon steel, adjustable, clevis.

C. Hangers for Pipe Sizes 6 Inches and Over: Adjustable steel yoke, cast iron roll, double hanger.

D. Multiple or Trapeze Hangers for Pipe Sizes to 4 inches: Steel channels with welded spacers and hanger rods.

E. Multiple or Trapeze Hangers for Pipe Sizes 6 Inches and Over: Steel channels with welded spacers and hanger rods; cast iron roll and stand.

F. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.

G. Wall Support for Pipe Sizes 4 to 5 Inches: Welded steel bracket and wrought steel clamp.

H. Wall Support for Pipe Sizes 6 Inches and Over: Welded steel bracket and wrought steel clamp; adjustable steel yoke and cast iron roll.

I. Vertical Support: Steel riser clamp.

J. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.

K. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

PART 3 EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Keep open ends of pipe free from scale and dirt. Whenever work is suspended during construction protect open ends with temporary plugs or caps.

E. After completion, fill, clean, and treat systems. Refer to Section 232500.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Route piping in orderly manner, plumb and parallel to building structure, and maintain gradient.

C. Install piping to conserve building space and avoid interference with use of space.

D. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

E. Pipe Hangers and Supports:

1. Install in accordance with ASME B31.9.
2. Place hangers within 12 inches of each horizontal elbow.
3. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
4. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
5. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

F. Provide clearance for installation of insulation and access to valves and fittings.

G. Slope steam piping one inch in 40 feet in direction of flow. Use eccentric reducers to maintain bottom of pipe level.

H. Slope steam condensate piping one inch in 40 feet. Provide drip trap assembly at low points and before control valves. Run condensate lines from trap to nearest condensate receiver. Provide loop vents over trapped sections.

I. Install valves with stems upright or horizontal, not inverted.

3.3 SCHEDULES

A. Hanger Spacing for Steel Steam Piping.

1. 1/2 inch: Maximum span, 8 feet; minimum rod size, 1/4 inch.
2. 3/4 inch and 1 inch: Maximum span, 9 feet; minimum rod size, 1/4 inch.
3. 1-1/4 inches: Maximum span, 11 feet; minimum rod size, 3/8 inch.
4. 1-1/2 inches: Maximum span, 12 feet; minimum rod size, 3/8 inch.
5. 2 inches: Maximum span, 13 feet; minimum rod size, 3/8 inch.
6. 2-1/2 inches: Maximum span, 14 feet; minimum rod size, 3/8 inch.
7. 3 inches: Maximum span, 15 feet; minimum rod size, 3/8 inch.
8. 4 inches: Maximum span, 17 feet; minimum rod size, 1/2 inch.
9. 6 inches: Maximum span, 21 feet; minimum rod size, 1/2 inch.
10. 8 inches: Maximum span, 24 feet; minimum rod size, 5/8 inch.

B. Hanger Spacing for Steel Steam Condensate Piping.

1. 1/2 inch, 3/4 inch, and 1 inch: Maximum span, 7 feet; minimum rod size, 1/4 inch.
2. 1-1/4 inches: Maximum span, 8 feet; minimum rod size, 3/8 inch.
3. 1-1/2 inches: Maximum span, 9 feet; minimum rod size, 3/8 inch.
4. 2 inches: Maximum span, 10 feet; minimum rod size, 3/8 inch.
5. 2-1/2 inches: Maximum span, 11 feet; minimum rod size, 3/8 inch.
6. 3 inches: Maximum span, 12 feet; minimum rod size, 3/8 inch.

END OF SECTION

SECTION 232214 - STEAM AND CONDENSATE HEATING SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Steam traps.

B. Steam air vents.

C. Boiler feed units.

D. Condensate return units.

E. Steam safety valves.

1.2 RELATED REQUIREMENTS

A. Section 232213 - Steam and Condensate Heating Piping.

B. Section 235223 - Cast-Iron Boilers.

1.3 REFERENCE STANDARDS

A. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1: Rules for Construction of Pressure Vessels 2019.

B. ASME B31.9 - Building Services Piping 2017.

C. ASTM A105/A105M - Standard Specification for Carbon Steel Forgings for Piping Applications 2018.

D. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings 2004 (Reapproved 2019).

E. ASTM A216/A216M - Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High-Temperature Service 2018.

F. ASTM A395/A395M - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures 1999 (Reapproved 2018).

G. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2018.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data:

1. Provide for manufactured products and assemblies required for this project.
2. Include product description, model, dimensions, component sizes, rough-in requirements, service sizes, and finishes.
3. Submit schedule indicating manufacturer, model number, size, location, rated capacity, load served, and features for each specialty.
4. Include electrical characteristics and connection requirements.

C. Manufacturer's Installation Instructions: Indicate application, selection, and hookup configuration. Include pipe and accessory elevations.

D. Operation and Maintenance Data: Include installation instructions, servicing requirements, and recommended spare parts lists.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with State of Montana standard for installation of boilers and pressure vessels.

1. Maintain one copy of each document on site.

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

C. Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

2.1 STEAM TRAPS

A. Steam Trap Applications:

1. Use Thermostatic Steam Traps for:
   a. Convectors.
   b. Unit ventilators.
   c. Other similar terminal heating units.
2. Use Float and Thermostatic Traps for:
   a. Unit heaters.
   b. Converters.
   c. Heating coils.
   d. Main headers.
   e. Branch lines.

B. Steam Trap Performance:

1. Select to handle minimum of two times maximum condensate load of apparatus served.
2. Pressure Differentials:
   a. Low Pressure Systems (5 psi and less): 1/4 psi.

C. Float and Thermostatic Traps: ASTM A126 cast iron or semi-steel body and bolted cover, stainless steel or bronze bellows type air vent, stainless steel or copper float, stainless steel lever and valve assembly

1. Rating: 15 psi WSP.
2. Features: Access to internal parts without disturbing piping, bottom drain plug.
3. Accessories: Gage glass with shut-off cocks.

D. Thermodynamic Traps: Stainless steel body, disc, and cap.

1. Rating: 300 psi WSP.
2. Features:
   a. Stainless steel insulating cap.
   b. 1/4 inch steel blow down valve.
   c. Integral strainer.

E. Pressure Balanced Thermostatic Traps: ASTM A395/A395M cast iron body and bolted or screwed cover and integral ball joint union for 125 psi WSP; phosphor bronze bellows, stainless steel valve and seat, integral stainless steel strainer.

2.2 STEAM AIR VENTS

A. 225 psi WSP: Balanced pressure type; ASTM A126 cast iron body and cover; access to internal parts without disturbing piping; phosphor bronze bellows, stainless steel valve and seat.

2.3 LOW PRESSURE BOILER FEED UNITS

A. Boiler Feed Units: Consist of receiver, inlet strainer, pumps, water make-up assembly, electric control components and accessories.

B. Condensate Receiver: Cast iron, equipped with water level gage, dial thermometer, pressure gages on pump discharge, bronze isolation valves and strainer between pumps and receiver, and lifter eye bolts.

C. Inlet Strainer: Cast iron, with vertical self-cleaning easily removable bronze screen and large dirt pocket, mounted on receiver.

D. Water Make-Up Assembly: Level control switch and solenoid valve mounted on receiver.

1. Valve: Packless, piston pilot operated type with cushioned closing and epoxy resin molded waterproof coil.
2. Capacity: Equal to one boiler feed pump.
3. With strainer, and manual bypass.

E. Pumps: Vertical design, bronze fitted with stainless steel shaft, enclosed bronze impeller, renewable bronze case ring, mechanical shaft seal, close coupled to motor.

2.4 LOW PRESSURE CONDENSATE RETURN UNITS

A. Condensate Return Units: Consist of receiver, inlet strainer, pumps, float switches, control panel and accessories.

B. Condensate Receiver: Cast iron, equipped with externally adjustable float switches, water level gage, dial thermometer, pressure gages on pump discharge, bronze isolation valves between pumps and receiver, and lifting eye bolts.

C. Inlet Strainer: Cast iron with vertical self-cleaning bronze screen and large dirt pocket, mounted on receiver. Screen shall be easily removable for cleaning.

D. Pumps: One stage, vertical design, bronze fitted with stainless steel shaft, bronze impeller, renewable bronze case ring, mechanical shaft seal, close coupled to 1750 rpm motor.

E. Control Cabinet:

1. NEMA 250 enclosure, UL listed, with piano hinged door, grounding lug, terminal strip, and fusible control circuit transformer.
2. Combination magnetic starters with overload relays, circuit breakers and cover interlock.
3. Electric alternator.
    a. Operate pumps on high level, alternating after each cycle.
    b. Operate second pump upon failure of first pump and alarm.
4. 'Auto-Off' switch.
5. Test button, high level alarm light, acknowledge button, alarm horn.

2.5 SAFETY RELIEF VALVES

A. Valve: Bronze body, stainless steel valve spring, stem, and trim, direct pressure actuated, capacities ASME certified and labelled.

B. Accessories: Drip pan elbow.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install steam and steam condensate piping and specialties in accordance with ASME B31.9.

B. Install specialties in accordance with manufacturer's instructions.

C. Steam Traps:

1. Provide minimum 3/4 inch size on steam mains and branches.
2. Install with union or flanged connections at both ends.
3. Provide gate valve and strainer at inlet, and gate valve and check valve at discharge.
4. Provide minimum 10 inch long, line size dirt pocket between apparatus and trap.

D. Remove thermostatic elements from steam traps during temporary and trial usage, and until system has been operated and dirt pockets cleaned of sediment and scale.

E. Rate relief valves for pressure upstream of pressure reducing station, for full operating capacity. Set relief at maximum 20 percent above reduced pressure.

F. Terminate relief valves to outdoors 2 feet minimum above roof. Provide drip pan elbow with drain connection to nearest floor drain.

END OF SECTION

SECTION 232500 - HVAC WATER TREATMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials.

1. System cleaner.
2. Steam system treatment.

B. By-pass (pot) feeder.

1.2 RELATED REQUIREMENTS

A. Section 016000 - Product Requirements: Owner furnished treatment equipment.

1.3 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide chemical treatment materials, chemicals, and equipment including electrical characteristics and connection requirements.

C. Manufacturer's Installation Instructions: Indicate placement of equipment in systems, piping configuration, and connection requirements.

D. Manufacturer's Field Reports: Indicate start-up of treatment systems when completed and operating properly. Indicate analysis of system water after cleaning and after treatment.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 016000 - Product Requirements, for additional provisions.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience. Company shall have local representatives with water analysis laboratories and full time service personnel.

B. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum 3 years of experience and approved by manufacturer.

1.5 REGULATORY REQUIREMENTS

A. Conform to applicable code for addition of non-potable chemicals to building mechanical systems and to public sewage systems.

B. Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 MATERIALS

A. System Cleaner:

1. Liquid alkaline compound with emulsifying agents and detergents to remove grease and petroleum products; sodiumtripoly phosphate and sodium molybdate.
2. Biocide chlorine release agents such as sodium hypochlorite or calcium hypochlorite or microbiocides such as quarternary ammonia compounds, tributyltin oxide, methylene bis (thiocyanate).

B. Steam System Treatment:

1. Sequestering agent to reduce hardness and prevent feedline congestion; phosphate.
2. Base to provide alkalinity; hydroxide.
3. Oxygen scavenger; sodium sulphite or hydrazine.
4. Carbon dioxide neutralizer; volatile amines such as morpholine or cyclohexylamine.
5. Filming amines; octadecylamine.

2.2 BY-PASS (POT) FEEDER

A. 2 quart quick opening cap for working pressure of 175 psi.

PART 3 EXECUTION

3.1 PREPARATION

A. Systems shall be operational, filled, started, and vented prior to cleaning. Use water meter to record capacity in each system.

B. Place terminal control valves in open position during cleaning.

C. Verify that electric power is available and of the correct characteristics.

3.2 CLEANING SEQUENCE

A. Concentration:

1. As recommended by manufacturer.
2. Fill steam boilers only with cleaner and water.

B. Steam Systems:

1. Apply heat, slowly raising boiler temperature to 160 degrees F and maintain for 12 hours minimum.
2. Cool, then drain as quickly as possible.
3. Refill with clean water, drain, refill and check for sludge.
4. Repeat until system is free of sludge.
5. Apply heat to produce steam for piping system and maintain for 8 hours minimum. Bypass traps and waste condensate.

C. Use neutralizer agents on recommendation of system cleaner supplier and approval of Architect.

D. Flush open systems and glycol filled closed systems with clean water for one hour minimum. Drain completely and refill.

E. Remove, clean, and replace strainer screens.

F. Inspect, remove sludge, and flush low points with clean water after cleaning process is completed. Include disassembly of components as required.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.4 CLOSED SYSTEM TREATMENT

A. Provide one bypass feeder on each system. Install isolating and drain valves and necessary piping. Install around balancing valve downstream of circulating pumps unless indicated otherwise.

B. Introduce closed system treatment through bypass feeder when required or indicated by test.

C. Provide 3/4 inch water coupon rack around circulating pumps with space for 4 test specimens.

3.5 STEAM SYSTEM TREATMENT

A. Provide bypass feeder on feed water line to each boiler.

B. Provide solution pumps to feed sequestering agent and base from solution tank into boiler. Provide minimum of one pump per boiler if treatment materials can be mixed. Provide agitator as required.

C. Activate solution pumps when feed water pumps are running.

D. Provide conductivity controller to sample boiler water and operate solenoid blowdown valve. Provide timer activated sampling with solenoid valve, balancing valve, and conductivity probe. Pipe to blowdown tank.

E. Provide 3/4 inch water coupon rack on each feed water pump with space for 4 test specimens.

F. Provide liquid level switch in each solution tank to deactivate solution pump and agitator and sound local alarm bell.

3.6 CLOSEOUT ACTIVITIES

A. Training: Train Owner's personnel on operation and maintenance of chemical treatment system.

1. Provide minimum of two hours of instruction for two people.
2. Have operation and maintenance data prepared and available for review during training.
3. Conduct training using actual equipment after treated system has been put into full operation.

3.7 MAINTENANCE

A. Provide for each project phase technical service visits to perform field inspections and make water analysis on-site. Detail findings in writing on proper practices, chemical treating requirements, and corrective actions needed. Submit two copies of field service report after each visit.

B. Provide laboratory and technical assistance services during this maintenance period.

C. Provide on-site inspections of equipment during scheduled or emergency shutdown to properly evaluate success of water treatment program, and make recommendations in writing based upon these inspections.

END OF SECTION

SECTION 235223 - CAST-IRON BOILERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Boilers.

B. Controls and boiler trim.

C. Steam and condensate connections.

D. Hot water connections.

E. Fuel connection.

F. Collector, draft hood, and chimney connection.

1.2 RELATED REQUIREMENTS

A. Section 232214 - Steam and Condensate Heating Specialties.

B. Section 235100 - Breechings, Chimneys, and Stacks.

1.3 REFERENCE STANDARDS

A. AHRI 1500 - Performance Rating of Commercial Space Heating Boilers 2015.

B. ANSI Z21.13 - American National Standard for Gas-Fired Low-Pressure Steam and Hot Water Boilers 2017.

C. ASME BPVC-IV - Boiler and Pressure Vessel Code, Section IV - Rules for Construction of Heating Boilers 2019.

D. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1: Rules for Construction of Pressure Vessels 2019.

E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2018.

F. NFPA 54 - National Fuel Gas Code 2018.

G. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

H. UL (DIR) - Online Certifications Directory Current Edition.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating general layout, dimensions, and size and location of water, gas, and vent connections, and electrical characteristics and connection requirements.

1.5 QUALITY ASSURANCE

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

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect units before, during, and after installation from damage to casing by leaving factory shipping packaging in place until immediately prior to final acceptance.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

A. Comply with ASME BPVC-IV and ASME BPVC-VIII-1 for boiler construction.

B. Comply with NFPA 70.

C. Comply with applicable codes for internal wiring of factory wired equipment.

D. Units: UL (DIR) listed and labeled.

E. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified and indicated.

2.2 MANUFACTURED UNITS

A. Steam Boilers: Suitable for forced draft with insulated jacket, sectional cast iron heat exchanger, natural gas burning system, refractory, controls, and boiler trim and fill system consisting of diaphragm type expansion tank, fill and check valve, and automatic air vent.

B. Provide water wall design consisting of water backed combustion area with water circulating around firebox. Refractory chamber or separate base not required.

2.3 FABRICATION

A. Assembly: Cast iron sections with 15 psi steam ASME Boilers and Pressure Vessels Code rating, assembled with push nipples or gaskets and draw rods.

B. Access: To flue passages for cleaning and flame observation ports.

C. Structural Base: Aluminized steel lined with high temperature mineral fiber insulating panels.

D. Jacket: Glass fiber insulated steel jacket, finished with factory applied baked enamel.

2.4 STEAM BOILER TRIM

A. ASME rated pressure relief valve, 15 psig.

B. Steam pressure gauge, 0 to 30 psig.

C. Water column gauge glass set with cocks.

D. Low water cut-off to prevent burner operation when boiler water drops below safe level and boiler condensate return pump control to maintain water level by controlling pump operation.

E. Operating pressure controller for burner to maintain steam pressure setting.

F. High limit pressure control with manual reset for burner to prevent steam pressure from exceeding system pressure.

2.5 FUEL BURNING SYSTEM

A. Burner Operation: On-off with low fire position for ignition.

B. Gas Burner: Forced draft type for natural gas adjustable combustion air supply, pressure regulator, gas valves, manual shut-off, intermittent spark or glow coil ignition, flame sensing device, and automatic 100 percent shut-off.

C. Gas Burner Safety Controls: Energize ignition, limit time for establishment of flame, prevent opening of gas valve until pilot flame is proven, stop gas flow on ignition failure, energize blower motor, and after air flow proven and slight delay, allow gas valve to open.

D. Collector and Draft Hood: Non-metallic vent pipe and air intake.

E. Controls: Pre-wired, factory assembled electronic controls in control cabinet with flame scanner or detector, programming control, relays, and switches. Provide pre-purge and post-purge ignition and shut-down of burner in event of ignition pilot and main flame failure with manual reset.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide connection of natural gas service in accordance with requirements of NFPA 54 and applicable codes.

C. Provide piping connections and accessories as indicated; refer to Section 232214.

D. Pipe relief valves to nearest floor drain.

3.2 SYSTEM STARTUP

A. Provide the services of manufacturer's field representative for starting and testing unit.

3.3 CLOSEOUT ACTIVITIES

A. Train operating personnel in operation and maintenance of units.

END OF SECTION

SECTION 238200 - CONVECTION HEATING AND COOLING UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Cabinet unit heaters.

B. Unit ventilators.

C. Air coils.

1.2 RELATED REQUIREMENTS

A. Section 230513 - Common Motor Requirements for HVAC Equipment.

B. Section 230719 - HVAC Piping Insulation.

C. Section 230913 - Instrumentation and Control Devices for HVAC.

D. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections. Installation of room thermostats. Electrical supply to units.

1.3 REFERENCE STANDARDS

A. AHRI Directory of Certified Product Performance - Air-Conditioning, Heating, and Refrigeration Institute (AHRI) Current Edition.

B. AHRI 350 - Sound Performance Rating of Non-Ducted Indoor Air-Conditioning and Heat Pump Equipment 2015.

C. AHRI 410 - Forced-Circulation Air-Cooling and Air-Heating Coils 2001, with Addendum (2011).

D. AHRI 840 - Unit Ventilators 1998.

E. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications Most Recent Edition Cited by Referring Code or Reference Standard.

F. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

G. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems 2018.

H. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible 2005 (Revised 2009).

1.4 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.

B. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

1.5 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide typical catalog of information including arrangements.

C. Shop Drawings:

1. Indicate cross sections of cabinets, grilles, bracing and reinforcing, and typical elevations.
2. Indicate air coil and frame configurations, dimensions, materials, rows, connections, and rough-in dimensions.
3. Submit schedules of equipment and enclosures typically indicating length and number of pieces of element and enclosure, corner pieces, end caps, cap strips, access doors, pilaster covers, and comparison of specified heat required to actual heat output provided.
4. Indicate mechanical and electrical service locations and requirements.

D. Selection Samples: For each finish product specified, color chart representing manufacturer's full range of available colors.

E. Certificates: Certify that coils are tested and rated in accordance with AHRI 410.

F. Manufacturer's Instructions: Indicate installation instructions and recommendations.

G. Project Record Documents: Record actual locations of components and locations of access doors in radiation cabinets required for access or valving.

H. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listings.

I. Warranty: Submit manufacturer's warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

J. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 016000 - Product Requirements, for additional provisions.
2. Extra Filters: One set of each type and size.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.7 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.1 STEAM CABINET UNIT HEATERS

A. Provide products listed, classified, and labeled by Underwriters Laboratories Inc. (UL), Intertek (ETL), or testing firm acceptable to Authority Having Jurisdiction as suitable for the purpose indicated.

B. Coils:

1. Evenly spaced aluminum fins mechanically bonded to copper tubes.
2. Steam: Suitable for working pressures not less than10 psi.

C. Cabinet: Minimum 16 gage, 0.0598 inch thick sheet steel front panel with exposed corners and edges rounded, easily removed panels, glass fiber insulation, integral air outlet, and inlet grilles.

D. Finish: Factory applied baked primer coat on visible surfaces of enclosure or cabinet.

E. Fans: Centrifugal forward-curved double-width wheels, statically and dynamically balanced, direct driven.

F. Motor: Tap wound multiple speed permanent split capacitor with sleeve bearings, resiliently mounted.

G. Control: Factory wired, solid state, infinite speed control, located in cabinet.

H. Filter: Easily removed, 1 inch thick glass fiber throw-away type, located to filter air before coil.

I. Fresh Air Dampers: Where indicated, automatic type, set to allow maximum of 25 percent fresh air to enter space. Refer to Section 230993 for automatic type operating sequence and Section 230913 for controls.

2.2 UNIT VENTILATORS

A. Performance Data and Safety Requirements:

1. Unit capacities certified and tested in accordance with AHRI 840 and AHRI 350.
2. Provide products listed, classified, and labeled by Underwriters Laboratories Inc. (UL), Intertek (ETL), or testing firm acceptable to Authority Having Jurisdiction as suitable for the purpose indicated.

B. Required Directory Listings: AHRI Directory of Certified Product Performance - Air-Conditioning, Heating, and Refrigeration Institute (AHRI).

C. Steam Coils:

1. Tube-in-tube, steam distributing coil design.
2. Factory pressure tested to ensure leak tight design.

D. Cabinet: 14 gage, 0.0747 inch sheet steel on solid base pan with exposed edges rounded. Provide removable front panels with quick-acting, key-operated cam locks. Provide removable die-cast or fabricated steel discharge grilles. For units having cooling coils, insulate internal parts and surfaces exposed to conditioned air stream with moisture resistant insulation.

E. Cabinet Accessories: Matching steel construction, reinforced, for use with unit ventilators or finned radiation, with steel alignment pins, adjustable kick plates with leveling bolts, shelves and sliding doors with locks as indicated, sinks, bubbler faucets and bowls, corner, end, and wall filler sections as required.

F. Finish: Factory applied baked primer coat on visible surfaces of enclosure or cabinet.

G. Fans: Centrifugal forward-curved double-width wheels, statically and dynamically balanced, direct driven, arranged to draw air through coil.

H. Wall Louvers: Anodized aluminum wall intake box and louvers removable from frame with 1/2 inch square mesh galvanized screen in back of louver.

I. Motor: Tap wound multiple speed permanent split capacitor with sleeve bearings, resiliently mounted.

J. Controls:

1. Provide units with control valves furnished by the automatic temperature controls manufacturer.
2. Controls Interface:
   a. Relay board.
   b. 24-volt transformer.
3. Provide ASHRAE Cycle II as defined in ASHRAE (HVACA) Handbook - HVAC Applications.

K. Filter: Easily removed 1 inch thick glass fiber throw-away type, located to filter air before coil.

L. Mixing Dampers: Multi-blade with compressible seal, capable of varying proportion of mixed air from 100 percent room air to 100 percent outside air.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are suitable for installation.

B. Verify that field measurements are as shown on the drawings.

3.2 INSTALLATION

A. Install in accordance with manufacturer's recommendations.

B. Install equipment exposed to finished areas after walls and ceilings are finished and painted.

C. Do not damage equipment or finishes.

D. Cabinet Unit Heaters:

1. Install as indicated.
2. Coordinate to ensure correct recess size for recessed units.

E. Unit Ventilators:

1. Locate as indicated, level and shim units, and anchor to structure.
2. Coordinate exact location of wall louvers. Center louvers below windows. All louvers shall be same elevation per floor.
3. Install shelving and auxiliary cabinetry.
4. Provide wall trim pieces for continuous wall-to-wall installation.

3.3 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for additional requirements.

B. Provide manufacturer's field representative to test, inspect, instruct, and observe.

3.4 CLEANING

A. See Section 017419 - Construction Waste Management and Disposal, for additional requirements.

B. After construction and painting is completed, clean exposed surfaces of units.

C. Vacuum clean coils and inside of units.

D. Touch-up marred or scratched surfaces of factory-finished cabinets using finish materials furnished by the manufacturer.

E. Install new filters.

3.5 CLOSEOUT ACTIVITIES

A. See Section 017800 - Closeout Submittals, for closeout submittals.

B. See Section 017900 - Demonstration and Training, for additional requirements.

3.6 PROTECTION

A. Provide finished cabinet units with protective covers during the balance of construction.

END OF SECTION